PB90-108481

Superfund Record of Decision (EPA Region 9): IBM (International Business Machines), San Jose, CA (First Remedial Action), December 1988

(U.S.) Environmental Protection Agency, Washington, DC

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EPA/ROD/R09-89/029
December 1988

EPA

Superfund Record of Decision:

IBM (San Jose), CA

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First Remedial Action - Final

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16. Abstract (Limit: 200 words)

International Business Machines (IBM) has owned and operated a facility that manufactures data processing machines in Santa Teresa Basin in San Jose, California. IBM has operated the facility since December 1956 using organic chemicals including TCA, acetone, xylene, and petroleum naphthas. The organics have been handled and stored onsite in drums, and above-ground and underground tanks. In addition, waste organic solvents were stored in concrete or steel underground tanks or drums; however, the concrete tanks were designed only to store organic wastes. In October 1980, while excavating tanks in Tank Farm No. 1, IBM discovered soil contaminated with organics. Futhermore, investigations in November 1981 revealed extensive ground water contamination. The ground water plume extends more than three miles northwest and is more than 180 feet in depth. Fourteen active or potentially active water supply wells are downgradient to the plume; however none of these public wells have been found to contain VOCs above State and Federal drinking water standards. Nineteen sources of soil and ground water contamination have been identified including tank overflows, spillage from drum handling, and tank and pipeline fitting failures. Activities to prevent further solvent migration from the IBM source areas have been conducted including removing underground storage tanks which were replaced with above-ground tanks, and (See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision - IBM (San Jose Plant), CA
First Remedial Action - Final
Contaminated Media: soil, gw
Key Contaminants: VOCs (xylenes, TCA), Organics

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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EPA/ROD/R09-89/029
IBM (San Jose Plant), CA
First Remedial Action - Final

16. Abstract (Continued)

excavating more than 23,000 yd3 of contaminated soil. Interim remedial measures begun in November 1982 to clean up the plume have included off- and onsite ground water extraction with discharge of untreated ground water to storm drains. The primary contaminates of concern affecting the soil and ground water are VOCs including TCA, toluene, and xylenes; and other organics.

The selected remedial action for this site includes onsite soil vapor extraction; onsite shallow and deep ground water, and offsite deep ground water pumping and treatment using air stripping, followed by onsite discharge of treated ground water to the aquifer and offsite discharge to surface water after the reuse capacity of the aquifer is exhausted. Remedial action costs for this remedy were not provided.

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RECORD OF DECISION

International Business Machines
San Jose, CA

December 1988

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PART 1

DECLARATION

RECORD OF DECISION
DECLARATION

SITE NAME AND LOCATION:
International Business Machines
San Jose, CA

STATEMENT OF BASIS AND PURPOSE

This document serves as EPA concurrence with the remedial action for the International Business Machines (IBM) site, as approved by the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). The RWQCB approved this remedial action in conformance with: Sections 13000 and 13304 of the California Water Code, State of California Health and Safety Code Section 25356.1, CERCLA, as amended by SARA, and the National Contingency Plan.

This EPA concurrence with the State's selection of remedy is based upon the RWQCB's Staff Report, the Remedial Action Plan, the Site Cleanup Requirements Order, the Responsiveness Summary, and the Administrative Record for this site. The attached index lists the items comprising the Administrative Record.

DESCRIPTION OF REMEDIAL ACTION

The selected remedy provides for final cleanup requirements related to onsite soils and groundwater, and offsite groundwater contamination. IBM has conducted interim remedial activities under RWQCB orders since 1984. The major components of the final selected remedy include:

- Onsite soil vapor extraction
- Onsite shallow and deep groundwater extraction and treatment with airstripping
- Offsite deep groundwater extraction and air stripping with nozzles into storm drains
- Onsite recharge of treated groundwater to maximum extent feasible
- Discharge to surface water under NPDES permit of any treated groundwater remaining after reuse capacity exhausted.

DECLARATION

EPA concurs with the remedy selected by the RWQCB for the IBM site.

The selected remedy is protective of human health and the environment, attains Federal and state requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy satisfies the statutory preference for remedies that reduce toxicity, mobility, and/or volume as a principal element. It also utilizes permanent solutions to the maximum extent practicable. The 5-year facility review provision has been included as part of the RWQCB Site Cleanup Requirements Order.

12.15.88
Date

John Wise
for Daniel W. McGovern
Regional Administrator

PART 2

STAFF REPORT

File No. 2189.8031(BAA)

REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
INTERNAL MEMO

TO: Steven R. Ritchie, Executive Officer

FROM: Belinda A. Allen

DATE: September 27, 1988

SIGNATURE: /s/Belinda A. Allen

SUBJECT: DRAFT REMEDIAL ACTION PLAN FOR INTERNATIONAL BUSINESS MACHINES, SAN JOSE FACILITY

The purpose of this staff report is to provide the basis for, and a description of, the draft final remedial action plan for the International Business Machines (IBM) site. Tentative Orders for IBM's Site Cleanup Requirements (SCR) and a NPDES permit are based on this staff report.

This staff report is organized as follows: 1) Background; 2) Plan Development; 3) Plan Description; 4) Recommendations.

BACKGROUND

International Business Machines (IBM) operates and owns a facility that manufactures data processing machines, including disks and mass storage systems at 5600 Cottle Road in the City of San Jose, Santa Clara County (Figure 1). Construction of the facility began in 1955 on land previously used for agricultural purposes. The facility has been in operation since December 1956. IBM used organic chemicals such as 1,1,1-trichloroethane (TCA), Freon 11, Freon 12, Freon 113, isopropyl alcohol (IPA), xylene, acetone, petroleum naphthas and others. Organic chemicals have been handled and stored in bottles, drums, above ground tanks, and under ground tanks.

Waste organic solvents were conveyed from, in some cases, intermediate waste sumps and stored in concrete or steel underground tanks (1000 or 6000 gallons) or in 55 gallon drums. The concrete tanks were designed to only store inorganic wastes, but organic chemical wastes were also stored in the concrete tanks.

Release Discovery

In October 1980, the discharger discovered TCA, petroleum naphtha and xylenes in soil during excavation of tanks in Tank Farm No. 1. The same month, the discharger confirmed that a release of chemicals had occurred and reported the release to Regional Board staff. Chemical analyses indicated that the soil in the source area contained up to 110 ppb of TCA, 16,000 ppm petroleum naphtha, and 1,100 ppm xylenes. In November 1981, additional investigation revealed extensive ground water pollution. At that time a comprehensive site-wide investigation program was initiated, as requested by Regional Board staff. Other sources of pollution were found, including a significant source of Freon 113. IBM was required to define the extent of all pollution, both in the soil and ground water, for each source. IBM has since identified at least nineteen sources, but has not yet fully identified the location of three sources of chemicals. IBM determined that the releases to soil and groundwater were due to tank and pipeline fitting failures, tank and sump overflows, spillage from drum handling, and other releases.

...continues

Geology

A geologic study was conducted on both the Santa Teresa Basin, where the facility is located, and the San Jose Plain, which is located downgradient of the Santa Teresa Basin. These are both sub-basins of the Santa Clara Basin. Edenvale Gap, located between Oak Hill and Edenvale Ridge is the geographic boundary and hydraulic connection between the Santa Teresa Basin and San Jose Plain (Figure 2).

The geology in the vicinity of the facility consists of alluvium extending below the ground surface to bedrock, a depth of more than 400 feet. This alluvial formation generally contains more than five silty clay layers which vary from a few feet to more than 30 feet in thickness separating more than six aquifers. These aquifers are referred to as A, B, C, D, E, F, and G aquifers, with A being the most shallow.

The general depths of these aquifers below ground surface are as follows: A occurs between 20 to 50 feet, B lies between 50 and 95 feet, C is between 90 and 125 feet and D is between 140 and 160 feet, E is between 170 and 205 feet, F is between 230 and 260 feet, and G is between 270 and 275 feet. In some locations, these individual aquifers merge. Also, these aquifer depths are very general; a major portion of the facility lies above the top of the A aquifer by only 15 to 25 feet.

The Edenvale Gap appears to be primarily merged BC and D aquifers (Figure 3). The San Jose Plain geology is similar to the Santa Teresa Basin, with the difference that aquifer zones are less continuous and thicker and the alluvium may be more than 750 feet thick to bedrock in some areas of the sub-basin.

Santa Teresa Basin acts as a forebay area. As a forebay area, the sub-basin recharges water through the Edenvale Gap into the San Jose Plain. Groundwater flows northwesterly from the site towards Edenvale Gap and downward from the shallow to deep aquifers. Continued pumping for water supply and groundwater remediation, combined with less efficient induced recharge from ponds and low rainfall, has contributed to overdraft conditions in the Santa Teresa Basin. The overdraft condition has caused declines in groundwater levels. Lowered ground water levels in the B aquifer have caused the B aquifer to change from a confined to a semi-confined aquifer in some areas.

Remedial Investigation

IBM has installed more than 300 monitoring and extraction wells to aid in plume characterization, source control, and remediation. The plume of chemicals from the site measures more than three miles in length extending northwesterly from the discharger's facility past the intersection of Monterey Road and Capitol Expressway (Figure 4) and is more than 180 feet in depth. In the plume area known as the Defined Area (Figure 2), the plume is laterally defined to 3 ppb. This area extends to near the intersection of Monterey Road and Capitol Expressway north of which is an area referred to as the Undefined Area. In a few wells in the Undefined Area TCA and Freon 113 have been detected in private and municipal wells at levels up to 2.8 ppb Freon 113 and up to 3.3 ppb TCA. These results, and the direction of ground water flow in this area, suggest that the plume extends significantly beyond the Defined Area. IBM is the only identified or known responsible party associated with the defined area of the plume, which extends from the facility northerly to the Edenvale Gap.

The issue of whether or not further plume definition was necessary beyond the intersection of Monterey Road and Capitol Expressway was brought to the Board in Order No. 84-90 on December 18, 1984. The Regional Board found in Order No. 84-90, Finding 11 and the State Board supported this finding in Order WQ No.86-8, III.a., that the degradation in the Undefined Area would not unreasonably affect beneficial uses and no further remediation was consistent with the maximum benefit to the people of the State; therefore, further plume definition was not required. However, the Regional Board did find that if additional data, methods of data evaluation, geological information, revised health guidance, or other issues which may impact the Regional Board's finding that beneficial uses were not unreasonably affected were developed, then the Board may consider altering that finding in the future.

IBM has identified several wells in the Defined Region which could be or have been potential conduits. These potential conduits may have transmitted chemicals to deeper aquifers. These wells have been properly destroyed, are scheduled for destruction, or cannot be located. Some wells cannot be found because they are under buildings, parking lots or streets, or are buried with no evidence of their location.

Migration Control and Source Removal

Activities to prevent further solvent migration from the IBM source areas include removal of the solvent storage tanks, excavation of soil containing pollutants and extraction of groundwater containing pollutants. IBM has removed more than 23,000 cubic yards of soil from the source areas on site. Starting in 1981 and continuing to 1985, the underground tanks were replaced with above ground storage tanks on the site. By September 1980, most of the underground solvent tanks were removed and replaced in above ground concrete vaults which allow for visual inspection to detect leakage. The vaults are also coated to prevent leakage into surrounding soil. Additionally, the shallow concrete trenches comprising the underground conveyance network have been substantially replaced with coated trenches or tunnels.

Interim remedial measures to cleanup the plume have included offsite and onsite groundwater extraction since November 1982. The discharger has installed and currently operates a three tiered groundwater extraction well system composed of more than 13 extraction wells located throughout the plume. Laterally, the plume is hydraulically controlled. Operation of the extraction wells has minimized further plume migration, slightly reduced the size of the plume, and reduced solvent concentrations within the plume. However, localized areas of higher pollutant concentrations within the plume may contribute to further interaquifer transfer via leaky aquitards and potential conduits.

Due to declining groundwater level effects on interim remediation, the Regional Board allowed IBM to reduce extraction as ordered in Regional Board Order No. 88-45 which amends Order No. 84-90. Groundwater extraction was reduced by about 73% from 8,900 acre feet/year to 2,400 acre feet/year and nine of the thirteen extraction wells were shut down to save about 6,500 acre feet/year of groundwater.

The extracted groundwater has been discharged under NPDES Permits in Order No. 83-37 and No. 83-39, primarily without treatment to storm drains leading to Canoas Creek which is tributary to Guadalupe River and flows into the south San Francisco Bay. Recharge from Canoas Creek may occur to a slight degree. Pollutants are found at nondetectable levels, which are less than 1 ppb for each TCA and Freon 113, at the confluence of Guadalupe River and Canoas Creek. Guadalupe River provides significant recharge to groundwater aquifers along its length.

Water-Supply Well Impacts

Fourteen water supply wells are known to exist as active or potentially active wells down gradient within the defined plume area (Figure 5). Three active water supply wells are known to exist within 300 feet of the defined area plume boundaries. Two public drinking water supply wells (Great Oaks Wells No. 2 and 8) have been affected by the IBM plume and were found to contain volatile organic chemicals (VOC'S). The VOC concentrations in the Great Oaks wells have been below current DHS drinking water action levels and federal drinking water standards. In January 1983, Great Oaks Water Company decided to stop regular service from Well No. 2 and Well No. 8, which was a standby well, and had not been used as a drinking water source since May 1983. Great Oaks Well No. 2 is now intermittently used as a standby well during peaks in water demand. A third well, Great Oaks well No. 14, was also found to contain low levels of VOC's, but Well No. 14 was an inactive irrigation well which had not been used for drinking water supply and has subsequently been destroyed.

In the past five years, only five private wells were found to contain more than an average of 11 ppb Freon or TCA. In one of the five wells, the highest levels of VOC's (430 ppb Freon 113 and 140 ppb TCA in 1983), were all below the Department of Health Services drinking water action levels. Use of this well for drinking water was discontinued in May 1983. As a result of clean-up measures undertaken by IBM; this well currently contains 20 ppb Freon 113 and 9.0 ppb TCA; nine drinking water wells monitored in the plume area have nondetected concentrations at less than 0.5 ppb detection limits; four drinking water wells contain no more than 1.0 ppb of Freon and 0.4 ppb TCA. Eight water supply wells have been taken out of service and destroyed since the investigation began.

The discharger has submitted a report containing a study of the effects of discharging volatile organic chemicals to Canoas Creek on groundwaters which may be recharged by the creek. Drinking water wells located about 2800 feet westerly of Canoas Creek were found to contain groundwater with a maximum of 2.4 ppb TCA which does not affect beneficial use. The connection, if any, between the IBM discharge and the occurrence of chemicals in these wells is not known. San Jose Water Company plans to operate these wells on a standby basis once Snell pipeline water is available to the water company. No additional investigation of Canoas Creek recharge is planned due to the very low concentrations of chemicals currently being discharged into the creek by IBM and the insignificance of recharge in Canoas Creek.

Governmental Regulation of Investigation and Remediation

In October 1984, the United States Environmental Protection Agency (EPA) proposed that the IBM site be placed on the federal Superfund list. Pursuant to the South Bay Multi-Site Cooperative Agreement, as subsequently amended, entered into in May 2, 1985, by the Board, EPA and DHS, the Board has been acting as the lead regulatory agency. DHS and EPA have reviewed and commented on the comprehensive plan. During the almost four years that the IBM site was a proposed CERCLA site, investigation and cleanup was regulated based on CERCLA requirements. Since June 21, 1988, the IBM site has been proposed to become a RCRA site and be dropped from consideration as a CERCLA site. In the event the IBM site becomes a RCRA site, the Regional Board will continue to regulate the remediation and enforce under CERCLA as amended by SARA.

The Board adopted Waste Discharge Requirements in Order No. 84-90 on December 18, 1984 for the discharger's interim site remediation. The State Board adopted Order No. WQ 86-8 which clarified the Regional Board Order and responded to appeals on Order No. 84-90. Order No. 84-90 was amended on March 16, 1988 by Regional Board Order No. 88-45. The State Board adopted Resolution No. 88-88 on July 21, 1988 in response to the issue of waste and unreasonable use of groundwater from remediation activities. This Site Cleanup Requirement Order rescinds Order No. 84-90 and 88-45. This Order sets tasks and submittal dates for final site remediation.

On July 21, 1988, the State Board adopted Resolution No. 88-88 which required that IBM and Fairchild remediation plans must result in beneficial use of, or treatment and recharge to the Santa Teresa Basin, of a significant amount of extracted groundwater. If use of recharge of significant amounts is not proposed, IBM shall fully justify reasons for not using or recharging the groundwater. The justification must also demonstrate why continued pumping is necessary from the standpoints of public health, protection of potential and present beneficial uses, maintaining high quality water, and providing the maximum benefit to the people of the State.

PLAN DEVELOPMENT

Development of the remedial action plan was based on federal and state regulations, policy and guidance for remedial action plans and feasibility studies. The purpose of the plan was to provide a conceptual framework for remedial design of additional remediation activities by IBM and to establish remediation levels.

IBM submitted a comprehensive plan as required by Regional Board Order No. 84-90 and State Board Order WQ No. 86-8. This comprehensive plan is also consistent with the Health and Safety Code requirements for a final remedial action plan (RAP) and the National Contingency Plan (NCP) requirements for a remedial investigation and feasibility study (RI/FS).

The comprehensive plan was reviewed by the staffs of the Regional Board, Department of Health Services, and the United States Environmental Protection Agency (EPA).

This comprehensive plan contains a proposed final remedial action plan, proposed remediation levels, a remediation alternatives evaluation, water conservation plan, contingency plans for short term sub-basin management and a public health evaluation. The objectives for the selected draft remedial action plan are to 1) protect public health and the environment, 2) attain appropriate and relevant, and applicable regulations (ARARs), 3) be cost-effective, 4) utilize permanent solutions and alternative treatment technologies to the maximum extent possible for short term effectiveness, 5) implementable, 6) acceptable based on State regulations, policies, and guidance, 7) reduce toxicity, mobility, or volume as a principal element of the draft remedial action plan, and 8) addresses the concerns of the public.

Alternatives Evaluation

As required by the Health and Safety Code Section 25356.1, CERCLA as amended by SARA, and Regional Board guidance, the draft RAP was developed from an evaluation of six alternative plans. Each plan would provide different levels of remediation at various costs.

The objectives of each alternative were:

1 - No further remediation
2 - Protection of beneficial uses
3 - Aquifer protection
4 - Aquifer protection with a safety factor
5 - Restore to background quality
6 - Aquifer protection with safety factor assuming variation in groundwater levels.

The discharger has based its evaluation of remediation alternatives and remediation levels on the Hazard Index concept. Since each chemical detected in the soil and groundwater has its own toxicity characteristics, the Hazard Index approach allows for decisions based upon the mixture of these different chemicals. Hazard Indices have been calculated for both possible noncarcinogenic effects (NCHI) and possible carcinogenic effects (CHI).

The NCHI is calculated as shown below using denominator values as listed in Table 3.

$$\sum_{i=1}^{n} \frac{\text{(actual concentration of each chemical in ppb)}}{\text{(each chemical's Table 3 concentration in ppb)}}$$

For example:

$$\frac{\text{ppb TCA}}{\text{200 ppb TCA}} + \frac{\text{ppb Freon 113}}{\text{18,000 ppb Freon 113}} + \frac{\text{ppb 1,1-DCE}}{\text{6 PPB 1,1-DCE}} + \frac{\text{ppb TCE}}{\text{52 ppb TCE}} + \ldots = \text{NCHI}$$

The CHI is similarly calculated as shown using denominator values as listed in Table 4.

$$\sum_{i=1}^{n} \frac{\text{(actual concentration of each chemical in ppb)}}{\text{(each chemical's Table 4 concentration in ppb)}}$$

A NCHI value greater than 1.0 indicates that health effects may occur due to long term exposure. A CHI value greater than 1.0 indicates a possible additional one in a million cancer risk from drinking two liters of water directly from the aquifer for 70 years. This risk is in addition to the every day one in four risk of contracting cancer. Department of Health Services (DHS) and the EPA have also reviewed the discharger's proposed use of Hazard Indices and found that the indices appear to be justified for drinking water based on available data. These values may increase or decrease based on possible future changes in action levels or other safe drinking water standards for these pollutants.

Alternatives one through five were based on stable basin groundwater conditions. Alternative 6 is comprised of three contingency plans each of which would be implemented depending on changing basin conditions.

Alt. Number	Remedial Action	Groundwater Remediation Level	Cost
1	No further cleanup		$550,000/yr
2	Operate 26 groundwater extraction wells for about 10 years.	Achieve drinking water levels at water supply wells.	$1,700,000 plus $770,000/yr
3	Operate 36 groundwater extraction wells for about 10 years.	Achieve drinking water levels in the aquifers.	$3,630,000 plus $880,000/yr
4	Operate up to 66 ground water extraction wells, treat and recharge groundwater in ponds for about 20 years.	Achieve one fourth or less than the drinking water levels in the aquifers.	$14,400,000 plus $2,860,000/yr
5	No feasible option found for this use.	Total removal of chemicals from soil and groundwater.	Infeasible cost
6	Operate up to 56 groundwater extraction wells, treat, reuse and recharge groundwater for about 20 years. Contains 3 contingency plans to respond to changing groundwater levels.	Achieve one fourth or less of the drinking water levels in the aquifer.	$8,100,000 to $13,700,000 plus $1,700,000/yr to $2,300,000/yr

The technical report "Draft Comprehensive Plan" dated June 1987, Draft Supplement Comprehensive Plan" dated April 29, 1988, and revisions to the reports contain a more detailed description and evaluation of these alternatives.

IBM initially proposed Alternative 4 until it was determined that changing groundwater basin conditions were contributing to overdraft, as a result of reduced rainfall, increased water supply and remediation groundwater extraction, and reduced artificial recharge. The overdraft conditions posed technical difficulties, i.e., groundwater may not be consistently available, for continued and expanded groundwater extraction and cleanup required by Alternative 4. Therefore, IBM proposed Alternative 6 after it was evaluated in the IBM report "Draft Supplement Comprehensive Plan" dated April 29, 1988, amended July 25, 1988.

Alternative 6, as described and proposed in the draft Supplement, does not completely meet staff concerns. As a result, the plan described in this staff report is a modification of the Alternative 6 plan proposed by IBM. The differences between the two plans are described later in this report.

PUBLIC INVOLVEMENT

There has been active public involvement throughout the whole process of devloping the remediation plans. All Regional Board orders which called for, or modified the cleanup plans have been adopted at public hearings (Regional Board in December 1984 and March 1988; State Board in March and June 1986 and again in February and June 1988). In preparation for adoption of the final Remedial Action Plans the Regional Board took the following actions to involve the public in determining aacceptable alternatives and in the final decision-making:

a. Sent out three fact sheets to over 1300 persons each mailing. These persons included adjacent neighbors within 300 feet of IBM, local government officials both appointed and elected, the water utilities utilizing the groundwater, and those interested individuals that responded to several newspaper advertisements announcing the RI/FS process and decision-making.

b. The Board staff held a night-time public workshop in August in the vicinity of the IBM facilities.

c. The Board conducted a public hearing in San Jose to receive testimony on the RI/FS and Remedial Action Plan.

d. The tentative remediation plan was widely distributed twice -- once in August with over a 30 day comment period -- and again in October (with responses to comments from the first distribution).

e. The Administrative Record has been available to the public since the announcement of the tentative remediation plan. The draft and amended versions of the remediation plan have been available to the public in the Santa Teresa Public Library in the vicinity of IBM since December 1986 as well as available in other libraries since August. Additionally, the plans and files of the Regional Board, to include the proposed and amended remediation plans, have been open to the public at all times since the initial discovery and Board action.

f. The Final Remedial Action Plan (RI/FS) will be adopted by the Board in a public hearing where final comments on the Plan and Board staff response may be offered by the interested public.

RECOMMENDED PLAN

This draft remedial action plan (RAP) is meant to be a comprehensive plan which addresses all aspects of soil and groundwater remediation, treatment, discharge, and reclamation. This describes how the draft plan would be implemented as recommended by staff and how the draft plan meets the objectives for protection of public health and the environment, attaining appropriate, relevant, and applicable regulations (ARARs), being cost effective, utilizing permanent solutions, and reducing toxicity, mobility, and volume.

Plan Description

The draft RAP is composed of three contingency plans:

1) Remedial Action Plan, which is a contingency plan, for stable basin conditions.
2) Contingency 1 for rising groundwater levels and improving basin conditions.
3) Contingency 2 for falling groundwater levels and declining basin conditions.

As discussed below, these contingency plans are similar with the exceptions that under increased overdraft conditions no additional extraction wells would be installed and full scale recharge may not be implemented. This plan may need to be modified in the future based on management of the basin and on the inherent uncertainties of yearly rainfall amounts and based on the performance evaluation to be conducted every five years after this order is adopted. Remediation levels for soil and groundwater may be attained within ten to twenty years.

Remedial design and initial implementation of the draft RAP would be dependent upon results of studies to be conducted during the year following RAP approval. These studies would evaluate:

1 - Irrigation, cooling tower use, and lake storage use seasonal patterns.
2 - Santa Teresa Basin conditions as a result of increased recharge pond efficiency and reduction of groundwater withdrawals in the sub-basin.
3 - Pilot study of *in-situ* soil aeration and full scale project feasibility.
4 - Air stripper pilot plant and treatability of IBM polluted groundwater.

Implementation of the draft remedial action plan, as modified, would require:

- Installation of additional groundwater extraction wells in the A aquifer. These wells would help prevent further migration of high chemical concentrations from the A aquifer and to accelerate remediation of groundwater saturated areas of the A aquifer. Remediation levels in the A aquifer would be to drinking water health criteria, standards, or action levels for each chemical, as listed in Table 2.

- Completion of pilot studies for in-situ soil aeration to determine the feasibility of full scale projects to remediate unsaturated soils in release areas on the IBM property. The goal for soil remediation is 1 ppm of chemicals in the soil depending upon technical feasibility which will be determined during pilot studies for soil cleanup. Some of the chemicals in the soil may not be removed as efficiently or at all compared to other chemicals. Therefore, a remediation goal rather than a level is recommended.

- Installation of additional extraction wells in the B and possibly deeper aquifers. The purpose of the B wells would be to prevent further lateral and downward migration of pollutants. However, use of the B extraction wells may be limited due to the overdraft condition of the sub-basin. As a modification of the IBM proposal, staff recommend the discharger prevent migration of the 0.25 NCHI and 1.0 CHI plumes. Extraction from deep aquifer wells need not occur unless water levels in the B aquifer are so low as to prevent migration control.

Remediation levels in the B and deeper aquifers would be 0.25 NCHI and 1.0 CHI as well as one fourth the noncarcinogen drinking water action level or health criteria for each chemical and the one in one million risk concentration for each carcinogen, as listed in Table 2.

The recommended draft remedial action plan does not provide for remediation below remediation levels of 0.25 NCHI. IBM provided a sensitivity analysis of the costs and impacts of remediating down to 0.1 NCHI which showed increased costs of about 73% more than the cost for remediation to 0.25 NCHI and would require extracting large volumes of groundwater to remove small amounts of chemicals. The possibility exists that the final remediation plan will be more efficient and rapid than expected. If that is the case, additional cleanup may be appropriate for Regional Board consideration at a later date to comply with the State Board policy to maintain the high quality of waters in the State of California.

- Sequential shut down for off site extraction wells once remediation goals have been achieved and maintained at each monitoring and extraction well. In accordance with State Board Order No. 86-90 the Regional Board will base its decision on an evaluation of monitoring data obtained after temporary shutdown of extraction wells prior to permanent abandonment of extraction wells. Monitoring after final abandonment of the wells will determine the effects on chemical migration due to natural groundwater flow.

- Reclamation of the extracted groundwater by recharge into shallow aquifers and reuse by IBM. This reclamation of groundwater is necessary to help aid the remediation of the shallow aquifers. The amount of groundwater reused by IBM for irrigation, cooling tower makeup flow, and fire water storage would be offset by a decrease in pumping of water supply wells owned by IBM. Recharge of the groundwater after treatment would occur via injection wells. The treated groundwater would be injected in the A and B aquifers upgradient of the IBM plume to aid in groundwater remediation (Figure 6). Recharge pilot studies will be conducted to determine the feasibility of and provide remedial design for a full scale recharge. A goal of optimized groundwater reuse and recharge is proposed to be 100% of the total amount of groundwater extracted from both on and off site extraction wells. However, IBM has stated that if water quality or quantity is not sufficient enough during Contingency 2 (falling groundwater levels) basin conditions, reuse may prove infeasible.

- Treatment of the polluted groundwater by two types of treatment. One type of treatment would be air stripping of groundwater from long and short term extraction in the A aquifer, both on and off site, and from long term extraction in the B aquifer on site. Depending on the basin conditions, two air strippers may be constructed. One air stripper would be used solely for the highly polluted groundwater from on site release areas. The quality of this groundwater may be highly variable and treated effluent quality may not be consistent. However, a level of 5 ppb for each chemical is proposed for discharges to the storm drain. The other air stripper would only be used for the less polluted groundwater except when overdraft conditions are present, then it would also treat groundwater from the release areas unless the other air stripper has already been constructed. Treatment of less polluted groundwater would provide groundwater containing 1 ppb total VOCs on the average and a maximum of 5 ppb total VOCs. This is the treated groundwater which would be used for recharge and reuse.

The second type of treatment is nozzle discharge of polluted groundwater into manholes. This treatment consists of forcing the extracted groundwater flowing in a large diameter pipe through a narrow diameter pipe in a manhole. Aeration of the polluted groundwater occurs due to the increased turbulence produced by the nozzle and the distance that the treated groundwater falls in the manhole to continue its journey down the storm drain. Nozzle treatment has been found to remove up to 50% of VOC concentrations. Staff consider nozzle treatment to be best available treatment which is economically achievable (BATEA) of the groundwater from the B and deeper aquifers off site, due to economic feasibility, protection of the environment, limited operation time, and siting constraints. Additionally, use of nozzles allows for increased flexibility in implementation of the RAP. Groundwater extraction rates will vary according to the number of extraction wells in operation. As basin conditions permit, additional extraction wells may be installed along with nozzle treatment without the considerable delay associated with construction of conventional treatment systems and pipelines. Also, as remediation levels are met, extraction wells would be temporarily shut down and discharge flow would decrease.

Untreated groundwater will be discharged to storm drains leading to Canoas Creek on an interim basis. Until the treatment systems are in operation, long term discharges from aquifer remediation will be untreated. Short term discharges result from monitoring well sample collection and aquifer testing. The purge water from sample collection will be untreated for B and deeper aquifer monitoring wells. This untreated water will be discharged to the storm drain nearest to the monitoring well. Prior to treatment system operation, the purge water from the A aquifer will be collected and either treated with the existing small treatment system on site or diluted with cleaner groundwater prior to discharge.

Major Differences Between IBM Proposal and Draft RAP

The technical reports submitted by IBM contain its proposal for a draft RAP and feasibility study. IBM's proposal is conceptually acceptable with some exceptions. The draft RAP, as explained above, is a modification of the IBM proposal. There are major differences between the two plans, as summarized below:

- Staff recommend that IBM control vertical and lateral migration of the 0.25 NCHI and 1.0 CHI plume boundaries during Contingency 2 conditions. IBM does not propose vertical migration control of concentrations above remediation levels during any of the contingency conditions.

- Staff propose full scale recharge and reuse during Contingency 2 basin conditions. IBM proposes only pilot scale recharge and reuse only if significant quantities of groundwater are being extracted.

- Staff propose extraction and piezometer well cluster installation at the location of the leading edge of the plume above remediation levels if necessary. IBM does not propose installation of the B aquifer extraction wells unless non-contingency 2 conditions exist. Additionally, IBM proposes piezometer installation only if necessary. Staff find that piezometer installation and monitoring of extraction well capture zones are always necessary to confirm capture areas.

- In order to assure that significant concentrations of chemicals do not pass through the Edenvale Gap, which could impact down gradient drinking water wells and users, staff proposes the following additional measures of compliance:

  a. Concentration limits be added for chemicals in the groundwater in the Gap. These limits are 30 ppb for Freon and TCA and 0.6 ppb for DCE.

  b. The groundwater in the Gap be monitored with an active pumping well to help assure representative sampling of water passing through the Gap.

- If remediation costs increase or decrease from the expected costs, the Board should consider whether or not to raise or lower remediation levels. IBM proposes that remediation levels only be raised if justified based on cost and technical feasibility.

- Groundwater reuse goals have been raised from 50 to 100%.

Remedial Action Objectives

The draft RAP would provide remediation of the aquifer in order to meet the following objectives:

Objective 1 - Protection of Public Health and the Environment

The draft RAP remedy is protective of human health and the environment by preventing further vertical or horizontal migration of chemical concentrations above remediation levels in the shallow aquifer and by treating the extracted groundwater prior to disposal. It also prevents migration of chemicals above remediation levels into the deeper drinking water aquifer and Canoas Creek. By stopping the migration of chemicals and treating the extracted groundwater, potential threats to the environment posed by allowing chemicals to enter Canoas Creek, Guadalupe River, and the local aquifers are reduced.

Objective 2 - Comply with Applicable or Relevant and Appropriate Regulations

The draft RAP will meet all substantive ARARs for the shallow and deep groundwater aquifers. The numerical limits that apply to the shallow and deep aquifers are listed in Tables 1 and 2.

One major ARAR is the State Board Resolution 68-16 "Statement of Policy with Respect to Maintaining High Quality of Waters in California". This policy requires that any change in water quality must be consistent with maximum public benefit and not unreasonably affect beneficial uses. The proposed remediation levels, based on currently available information, are acceptable at this site given that the limited degradation would not exceed any established water quality policies, the water quality is well below applicable health criteria, and degradation has already occurred and would not unreasonably affect beneficial uses.

If new information indicates remediation levels cannot be reasonably attained or can be reasonably surpassed, the Board will decide if further final remediation actions beyond those completed to attain remediation levels shall be implemented at this site based, to a significant degree, on the information developed from draft RAP implementation. If changes in health criteria, administrative requirements, site conditions, or remediation efficiency occur, the discharger will submit an evaluation of the effects of these changes on remediation levels.

Objective 3 - Cost Effectiveness

This draft RAP is cost effective based on an evaluation of costs for the entire draft RAP, including groundwater and soil remediation, reclamation, and soil and groundwater treatment.

Objective 4 - Utilizes Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable.

The draft RAP meets the SARA preference for permanent solutions to the maximum extent practicable. It will remove the chemicals form the soil and groundwater and will eliminate the threat to human health and the environment.

Objective 5 - Reduces Toxicity, Mobility, and Volume

The draft RAP focuses on treatment of the groundwater to specified remediation levels. This treatment technology will reduce the toxicity of the chemicals by reducing their concentrations and rendering them harmless. Mobility is reduced by use of the groundwater extraction system, preventing the further spread of the plumes. Also, by extracting and treating the shallow groundwater, it is expected that the volumes of the plumes will be reduced.

Objective 6 - Meets Public Acceptance

The modified draft RAP should meet public acceptance based upon the comments received and changes made in the RAP as recommended for the October 19 Board meeting. The public has has had access to and been involved in the decision-making process during the entire process. While not all public comments could be accommodated in the recommended alternaative, it is believed that public acceptance will be met with the proposed plan.

IMPACTS RESULTING FROM DRAFT RAP IMPLEMENTATION

Implementation of this draft RAP will impact the public and environment as described below.

One impact will be to residential roads and property. Pipes, nozzles, and possibly manholes will need to be installed in localized areas near the extraction wells. Additional extraction and monitoring wells would be installed on private property, once property owners grant access. This proposed off site construction may interfere with traffic flow and residents in the area. This interference would last for the construction time necessary for each treatment unit and pipe to be installed.

A second impact will be redistribution of chemicals from the groundwater to the air, surface waters of landfills. The proposed aeration treatment without activated carbon air scrubbers would transfer dilute concentrations of chemicals from the groundwater to the air. If scrubbers are used (the anticipated cleanup costs include use of scrubbers), then the spent carbon most likely would be distributed to either landfills or to incinerators for chemical breakdown. Trace concentrations of pollutants from Guadalupe River may recharge aquifers and may flow into the southern portion of the San Francisco Bay. Due to the large amount of time necessary for complete implementation of the proposed plan, discharge of pollutants will continue for the next 10 to 20 years.

A third impact would be that low chemical concentrations will remain in the aquifer and affect water supply wells (*Figure 5A*). Chemical concentrations in the downgradient water supply wells, especially wells in the undefined area, may increase, although it is not expected. Even minimal increases should not impact beneficial uses and will still be protective of human health.

A fourth impact may result due to aquifer injection of treated groundwater. There is the potential that wells previously unaffected by the IBM pollution would be affected by the injected groundwater (Figure 6). The amount of water recharged may be limited to reduce this impact.

RECOMMENDATION

1 - The draft RAP as described in this report should be found acceptable based on the Health and Safety Code Section 25356.1.

2 - The draft RAP should be considered to meet Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as an equivalent to a feasibility study and found to be protective of human health and the environment, attains Applicable or Relevant and Appropriate Requirements (ARARs), is cost effective, utilizes permanent solutions and alternative treatment technologies and resource recovery technologies to the maximum extent possible, and reduces toxicity, mobility, and volume of pollutants and addresses the concerns of the public.

Concur: WKB
Wil Bruhns, Section Leader

Concur:
Steven I. Morse, Division Chief

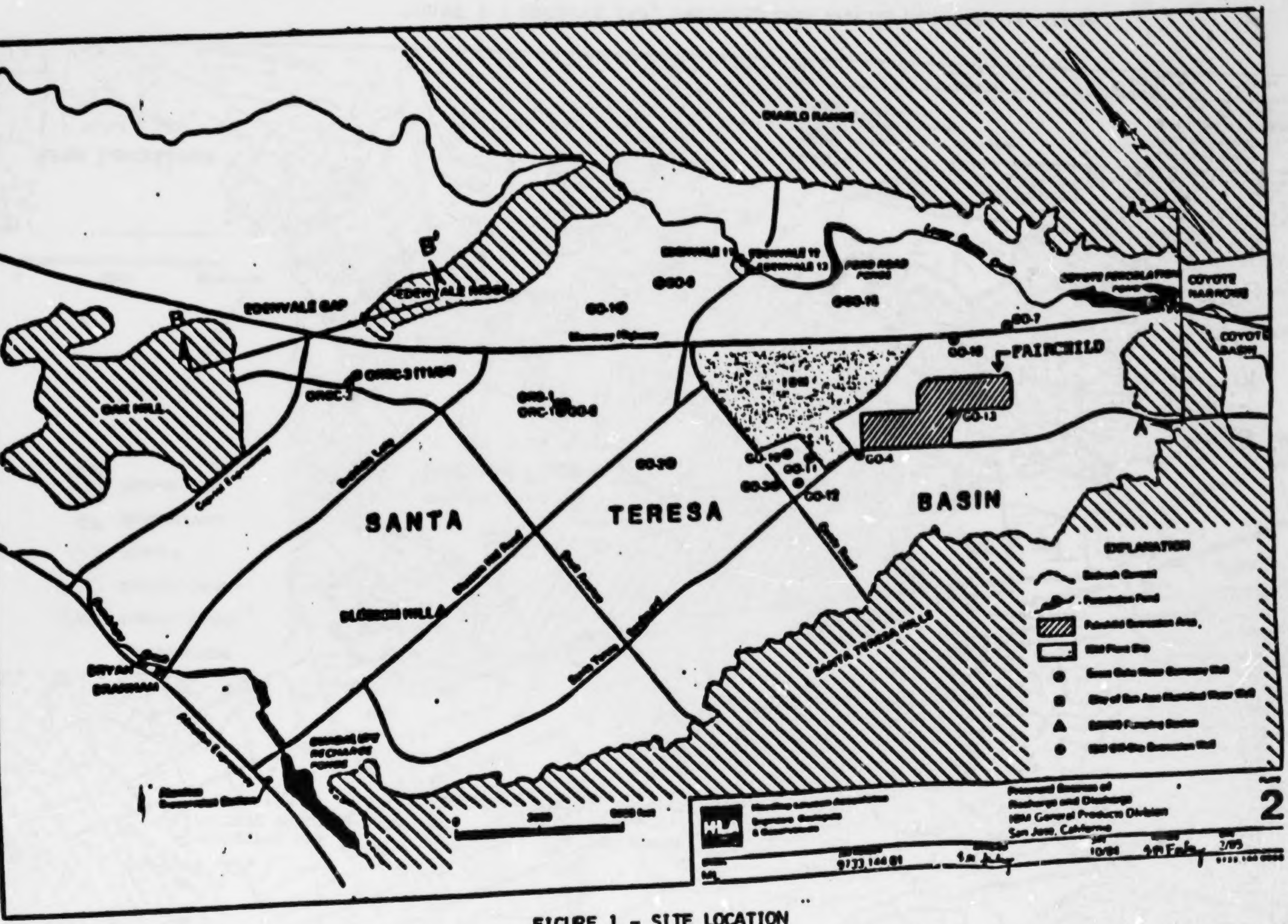

DIABLO RANGE
EDENVALE GAP
EDENVALE RIDGE
OAK HILL
ORRC-2
EDENVALE 11
EDENVALE 12
EDENVALE 13
FORD ROAD PONDS
GO-10
GO-15
COYOTE NARROWS
COYOTE BASIN
GO-7
GO-18
FAIRCHILD
GO-13
GO-4
GO-11
GO-12
GO-20
SANTA
TERESA
BASIN
BLOSSOM HILLS
SANTA TERESA HILLS
BRYAN
BRANHAM
EXPLANATION
HLA
IBM General Products Division
San Jose, California
2
9733,144.01
10/84
2/85

FIGURE 1 - SITE LOCATION

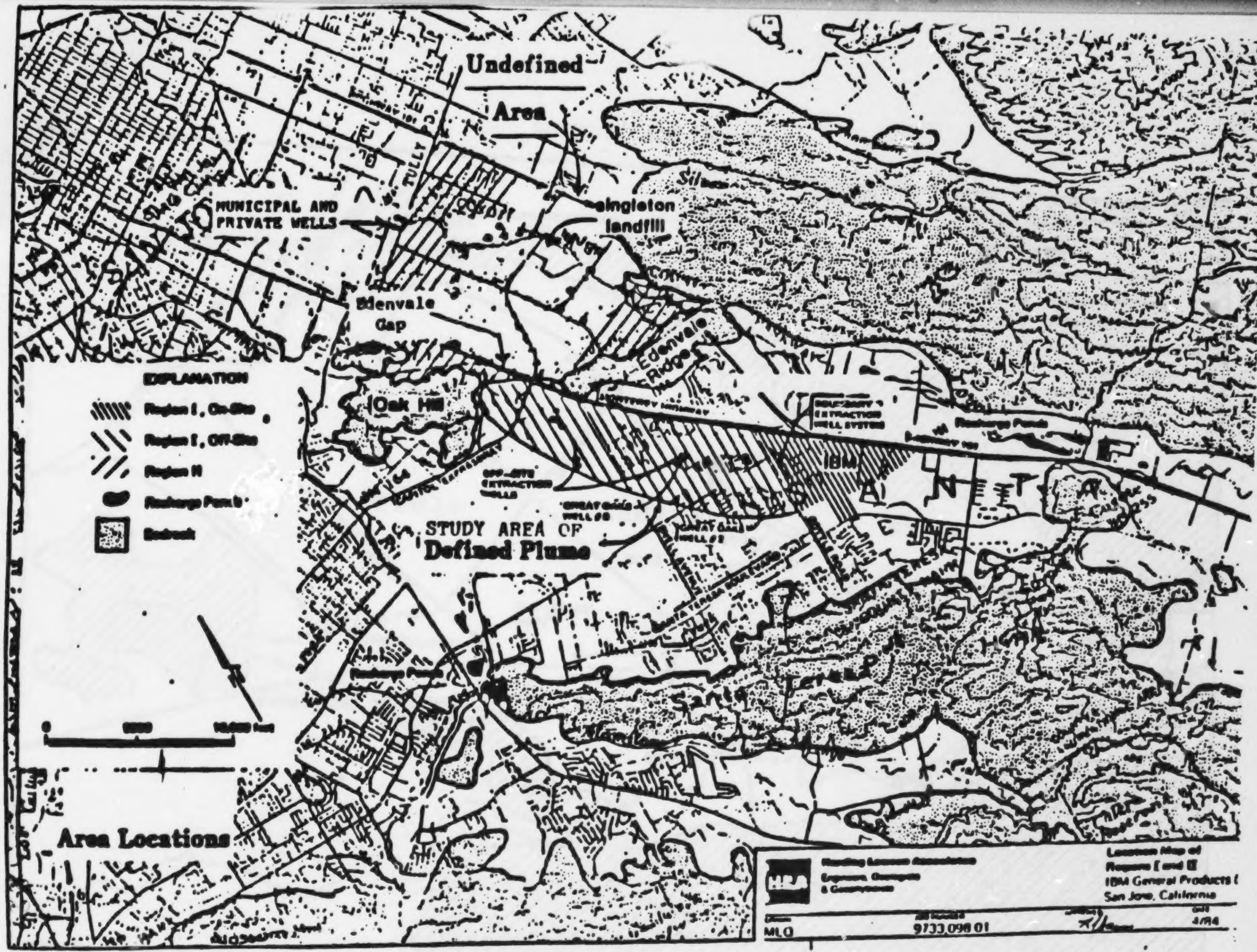
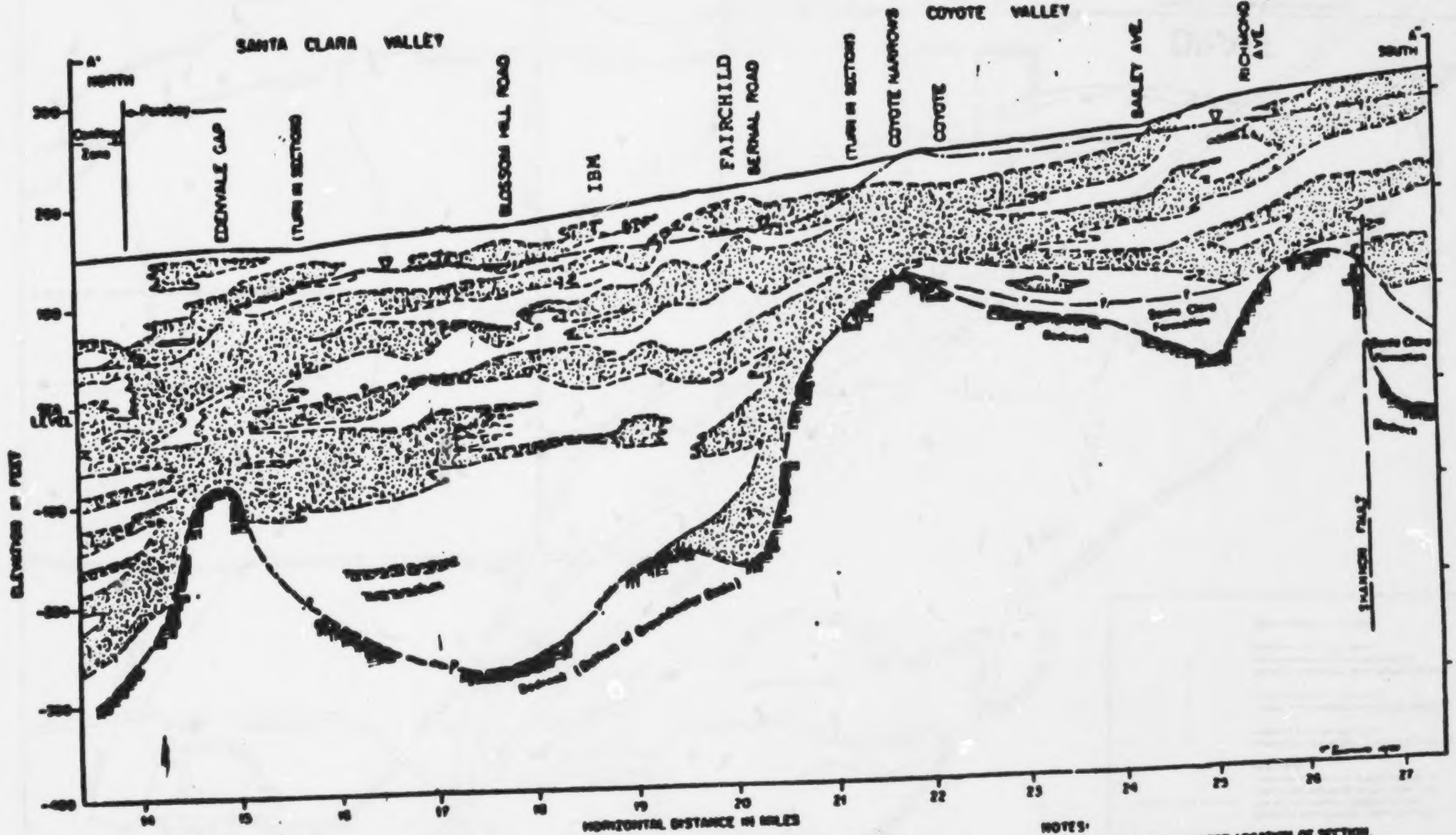

Undefined
Area
TULLY
MUNICIPAL AND
PRIVATE WELLS
Singleton
landfill
Edenvale
Gap
Edenvale
Ridge
Oak Hill
EXTRACTION
WELL SYSTEM
Recharge Ponds
IBM
STUDY AREA OF
Defined Plume
EXPLANATION
Region I, On-Site
Region I, Off-Site
Region II
Recharge Pond(s)
Bedrock
0
Area Locations
Location Map of
Regions I and II
IBM General Products
San Jose, California
MLO
9733,098 01
4/84

FIGURE 2 - EDENVALE GAP, UNDEFINED AREA AND DEFINED AREA LOCATIONS


SANTA CLARA VALLEY
COYOTE VALLEY
A'
NORTH
A"
SOUTH
Forebay
Confining Zone
EDENVALE GAP
(TURN IN SECTION)
BLOSSOM HILL ROAD
IBM
FAIRCHILD
BERNAL ROAD
(TURN IN SECTION)
COYOTE NARROWS
COYOTE
BAILEY AVE.
RICHMOND AVE.
SHANNON FAULT
Santa Clara Formation
Bedrock
ELEVATION IN FEET
300
200
100
SEA LEVEL
-100
-200
-300
-400
14
15
16
17
18
19
20
21
22
23
24
25
26
27
HORIZONTAL DISTANCE IN MILES

LEGEND

▨ DISTINGUISHABLE AQUIFERS—MIXTURES OF GRAVEL AND SAND, MEDIUM TO VERY HIGH PERMEABILITIES.

☐ AQUITARD--MIXTURES OF CLAY AND SILT, WITH SOME SAND AND GRAVEL, LOW TO VERY LOW PERMEABILITIES

—∇— APPROXIMATE WATER TABLE, 1984

NOTES:

1. REFER TO FIGURE [illegible] FOR LOCATION OF SECTION.
2. INTERPRETIVE SECTION BASED UPON AVAILABLE WELL LOGS.
3. MOST OF SECTION A'-A" IS FOREBAY ZONE, TO JUST PAST EDENVALE GAP

INTERPRETIVE GEOLOGIC SECTION, A'–A"

PORTIONS OF SANTA CLARA AND COYOTE VALLEYS

FIGURE 3 - GEOLOGIC CROSSECTION FROM EDENVALE GAP TO COYOTE NARROWS

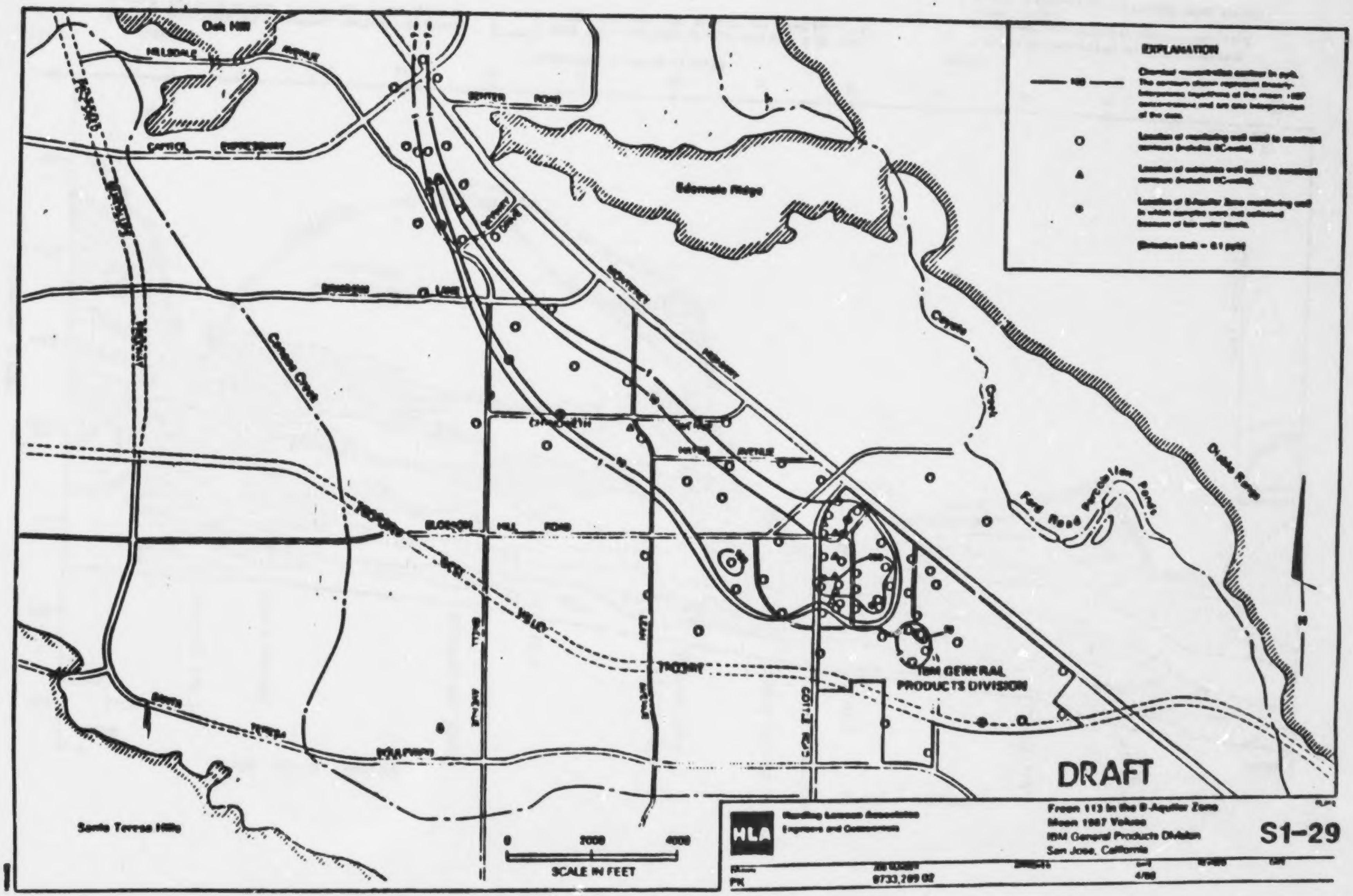

Oak Hill
HILLSDALE AVENUE
CAPITOL EXPRESSWAY
SENTER ROAD
Edenvale Ridge
MONTEREY HIGHWAY
BRANHAM LANE
Canoas Creek
Coyote Creek
CHYNOWETH
HAYES AVENUE
BLOSSOM HILL ROAD
SNELL AVENUE
LEAN AVENUE
COTTLE ROAD
Ford Road
Percolation Ponds
Diablo Range
IBM GENERAL PRODUCTS DIVISION
Santa Teresa Hills
N
EXPLANATION
(Detection limit = 0.1 ppb)
DRAFT
0
2000
4000
SCALE IN FEET
HLA
Engineers and Geoscientists
Freon 113 in the B-Aquifer Zone
Mean 1987 Values
IBM General Products Division
San Jose, California
S1-29
PK
8733,289 02
4/88

FIGURE 4 - IBM PLUME LOCATION

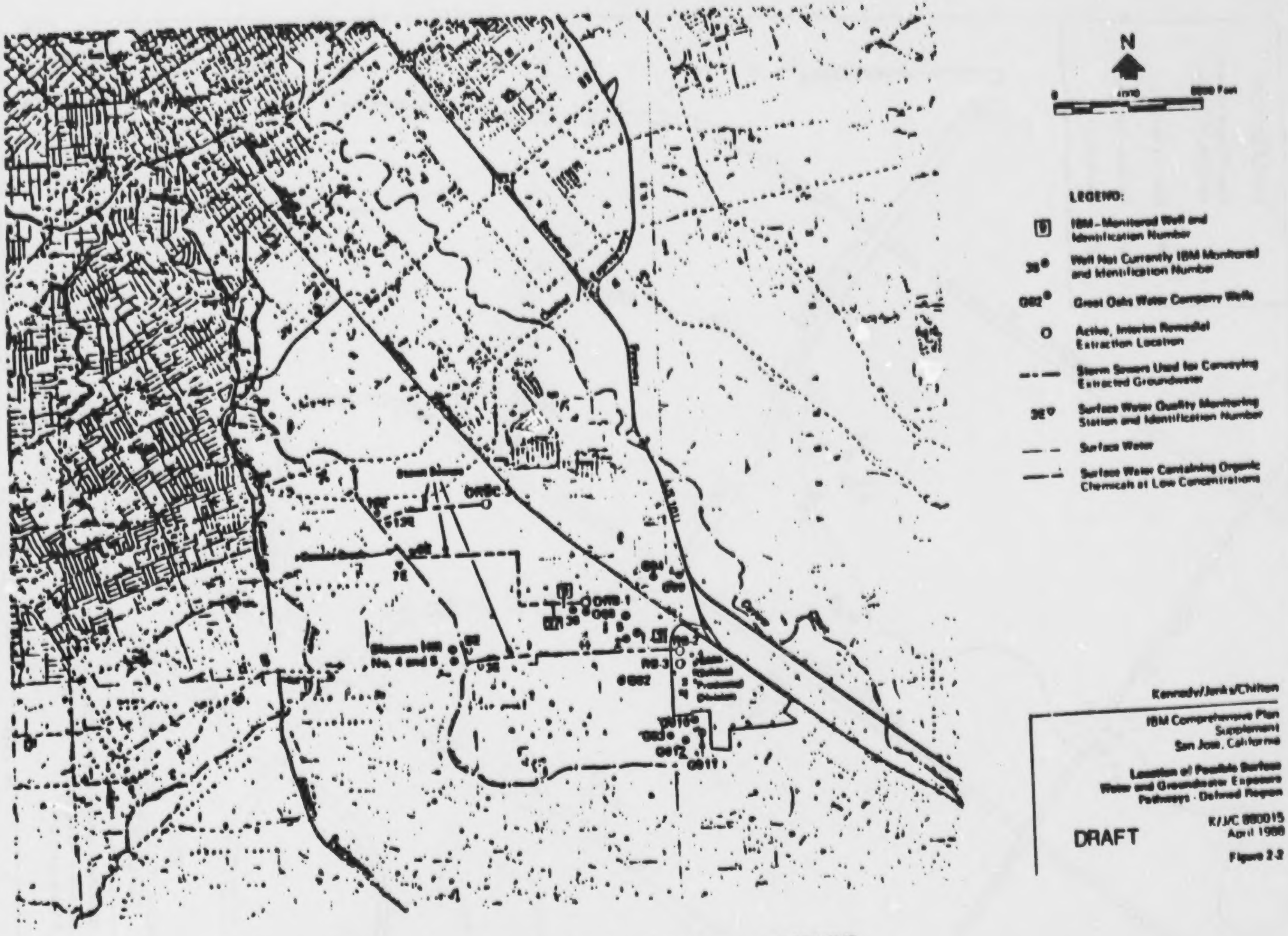
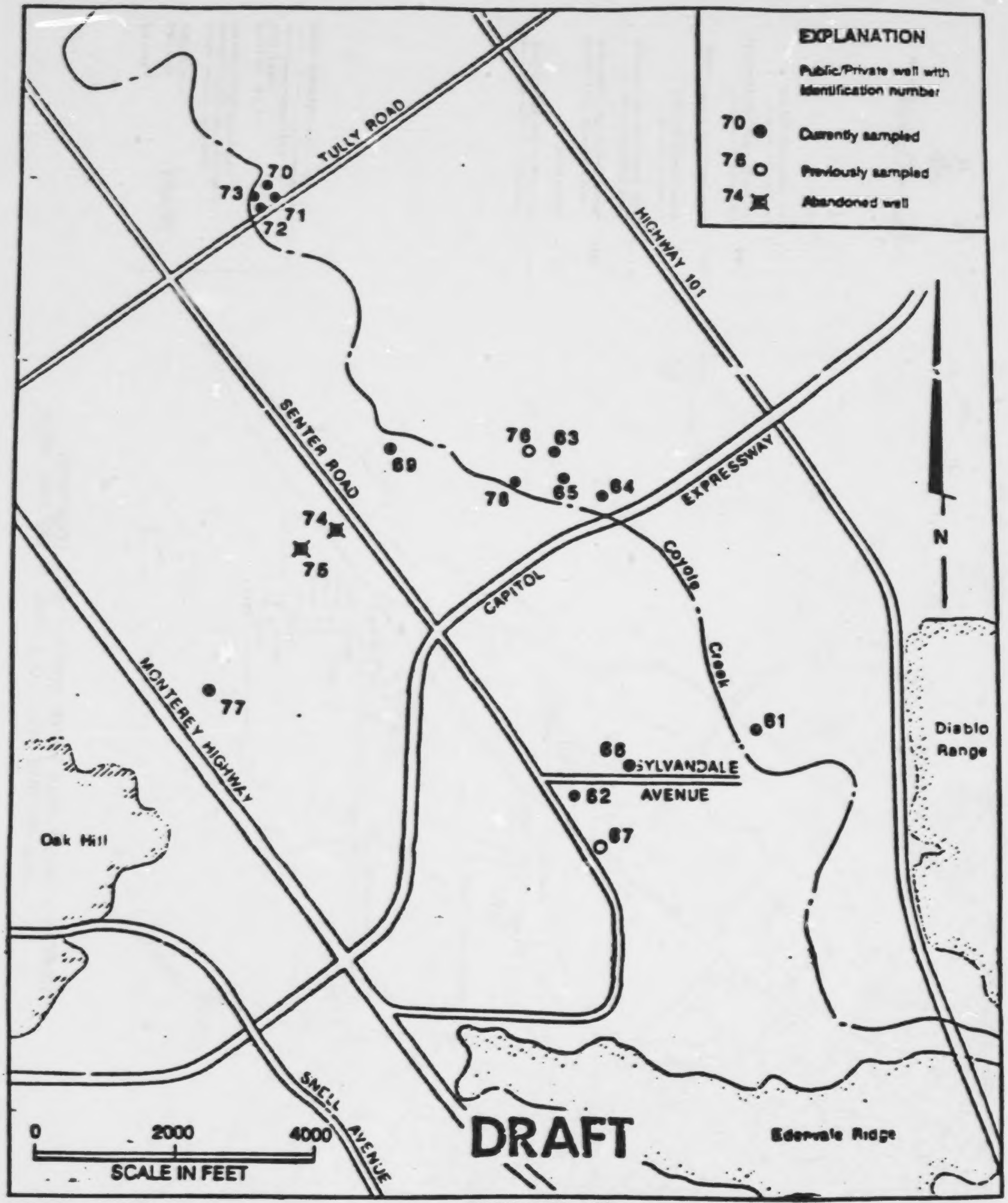

N
0
4000
8000 Feet
LEGEND:
IBM-Monitored Well and Identification Number
38 Well Not Currently IBM Monitored and Identification Number
G02 Great Oaks Water Company Wells
Active, Interim Remedial Extraction Location
Storm Sewers Used for Conveying Extracted Groundwater
3E Surface Water Quality Monitoring Station and Identification Number
Surface Water
Surface Water Containing Organic Chemicals at Low Concentrations
Kennedy/Jenks/Chilton
IBM Comprehensive Plan Supplement
San Jose, California
Location of Possible Surface Water and Groundwater Exposure Pathways - Defined Region
K/J/C 880015
April 1988
Figure 2-2
DRAFT
G012
G011
RW-3
G02

FIGURE 5 - GREAT OAKS WATER COMPANY WELL LOCATIONS AND PRIVATE WELL LOCATIONS IN DEFINED AREA

8


EXPLANATION
Public/Private well with identification number
70 ● Currently sampled
76 ○ Previously sampled
74 ☒ Abandoned well
TULLY ROAD
HIGHWAY 101
SENTER ROAD
CAPITOL EXPRESSWAY
Coyote Creek
MONTEREY HIGHWAY
SNELL AVENUE
SYLVANDALE AVENUE
Oak Hill
Diablo Range
Edenvale Ridge
N
70
71
72
73
69
76
63
78
65
64
74
75
77
61
66
62
67
0
2000
4000
SCALE IN FEET
DRAFT

Harding Lawson Associates
Engineers Geologists
& Geophysicists

Well Location Map
Public/Private Wells, Region II
IBM General Products Division
San Jose, California

PLATE
S1-9

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
PK	9733,289.022		4/88		

FIGURE 5A - SAN JOSE WATER COMPANY AND PRIVATE WELLS IN THE UNDEFINED AREA

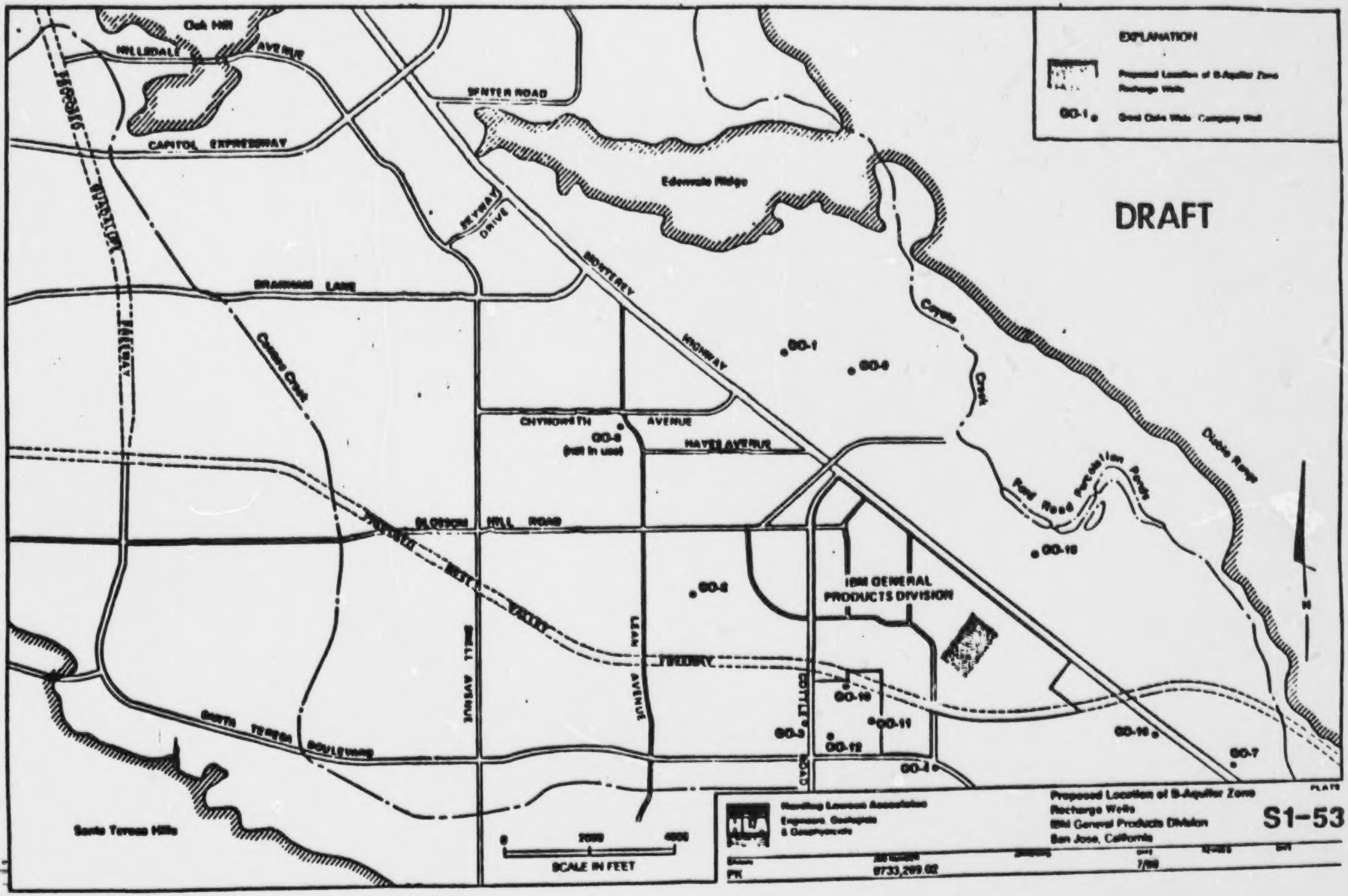

EXPLANATION
Proposed Location of B-Aquifer Zone Recharge Wells
GO-1 Great Oaks Water Company Well
DRAFT
Oak Hill
HILLSDALE AVENUE
SENTER ROAD
CAPITOL EXPRESSWAY
Edenvale Ridge
PEYWAY DRIVE
BRANHAM LANE
MONTEREY HIGHWAY
Coyote Creek
Canoas Creek
GO-1
GO-6
CHYNOWETH AVENUE
GO-5 (not in use)
HAYES AVENUE
Ford Road Percolation Ponds
Diablo Range
N
BLOSSOM HILL ROAD
PROPOSED WEST VALLEY FREEWAY
GO-2
IBM GENERAL PRODUCTS DIVISION
GO-15
SNELL AVENUE
LEAN AVENUE
COTTLE ROAD
GO-10
GO-11
GO-3
GO-12
GO-4
GO-16
GO-7
SANTA TERESA BOULEVARD
Santa Teresa Hills
PROPOSED GUADALUPE FREEWAY
0 2000 4000
SCALE IN FEET
Harding Lawson Associates
Engineers, Geologists & Geophysicists
Proposed Location of B-Aquifer Zone
Recharge Wells
IBM General Products Division
San Jose, California
PLATE
S1-53
PK
9733,269.02
7/88

FIGURE 6 - PROPOSED RECHARGE AREA IN RELATION TO GREAT OAKS WATER WELLS

PART 3

SITE CLEANUP REQUIREMENTS ORDER

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 88-157

SITE CLEANUP REQUIREMENTS FOR:

INTERNATIONAL BUSINESS MACHINES
SAN JOSE
SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Regional Board) finds that:

1. International Business Machines (IBM), hereinafter called the discharger, operates and owns a facility that manufactures data processing machines, including disk drives and mass storage systems, at 5600 Cottle Road in the City of San Jose, Santa Clara County (Attachment 1). Construction of the facility began in 1955 on land previously used for agricultural purposes. The facility has been in operation since December 1956.

2. The Regional Board adopted Waste Discharge Requirements in Order No. 84-90 on December 18, 1984 for the discharger's interim site remediation. The State Water Resources Control Board (hereinafter State Board) adopted Order No. WQ 86-8 which clarified the Regional Board Order and responded to appeals on Order No. 84-90. Order No. 84-90 was amended on March 16, 1988 by Regional Board Order No. 88-45. This Site Cleanup Requirement Order rescinds Orders No. 84-90 and 88-45. This Order sets tasks and submittal dates for final site remediation to be consistent with the Health and Safety Code and the National Contingency Plan.

3. At the facility, organic chemicals are and have been handled and stored in bottles, drums, above ground tanks, and under ground tanks. The discharger uses organic chemicals such as 1,1,1-trichloroethane (TCA), Freon 11, Freon 12, Freon 113, isopropyl alcohol (IPA), xylene, acetone, petroleum naphthas and other organic chemicals during the disk manufacturing process.

4. In October 1980, the discharger discovered TCA, petroleum naphtha and xylenes in soil during excavation of underground tanks and after confirming that a release of chemicals had occurred, reported the release to Regional Board staff. In November 1981, additional investigation revealed extensive ground water pollution and a

comprehensive site-wide investigation program was initiated as requested by Regional Board staff. Other releases of chemicals from the discharger were found, including a significant release of Freon 113. The discharger determined that the releases to soil and groundwater were due to tank and pipeline fitting failures, tank and sump overflows, spillage from drum handling, and other releases.

5. Groundwater investigation was conducted by the discharger in both the Santa Teresa Basin, where the facility is located, and the San Jose Plain, which is located northerly and downgradient of the Santa Teresa Basin (Attachment 2). Groundwater overdraft conditions are present in the Santa Teresa Basin. Edenvale Gap, located between Oak Hill and Edenvale Ridge is the geographic boundary and hydraulic connection between the Santa Teresa Basin and the San Jose Plain. The geology in the vicinity of the facility consists of alluvium extending below the ground surface to bedrock, a depth of more than 400 feet. The groundwater flows northwesterly from the site towards Edenvale Gap. The San Jose Plain geology consists of aquifer zones which are less continuous and thicker than the Santa Teresa Basin. The San Jose Plain alluvium may be more than 750 feet thick from the ground surface to bedrock.

6. The plume of volatile chemical organic chemicals laterally extends from the discharger's property to beyond Edenvale Gap. The area of the plume, known as the defined area, is defined to 3 ppb each of TCA and Freon 113 and extends from the discharger's property to near the intersection of Monterey Road and Capitol Expressway. Downgradient of the defined area and northerly of Edenvale Gap is the area referred to as the undefined area. No monitoring wells have been installed in the undefined area. Geologic information for the undefined area was obtained from well logs for water supply wells located in the undefined area. TCA and Freon 113 have been detected in private and municipal wells located in the undefined area at levels up to 2.8 ppb Freon 113 and up to 3.3 ppb TCA. These results, and the direction of groundwater flow in this area, suggest that the plume extends significantly beyond the defined area. Pursuant to the Health and Safety Code Sections 25356.1 (d) and 25356.3 (c), the discharger is the only identified or known responsible party associated with the defined area of the plume, which extends from the facility northerly to the Edenvale Gap.

7. The Regional Board found in Order No. 84-90, Finding 11 and the State Board, supported this finding in Order WQ No. 86-8, III.a., that the degradation in the undefined area would not unreasonably affect beneficial uses and no further remediation was consistent with the

maximum benefit to the people of the State; therefore, further plume definition was not required based on available information.

8. Fourteen water supply wells are known to exist as active or potentially active wells down gradient within the defined plume area. Three active wells are known to exist within 300 feet of the defined area plume boundary of 1 ppb Freon 113. Some of these public and private drinking water supply wells have been affected by the discharger's plume and are found to contain volatile organic chemicals (VOC's) below Department of Health Services drinking water action levels and Federal drinking water standards. In January 1983, one water supplier stopped regular service from its water supply wells and drinking water supply from some private wells was discontinued even though the highest levels of VOC's were below the Department of Health Services (DHS) Drinking Water Action Levels. Currently, as a result of clean-up measures undertaken by the discharger, nine drinking water wells monitored in the plume area have nondetectable concentrations at less than 0.5 ppb detection limits and four drinking water wells contain no more than 1.0 ppb of Freon and 0.4 ppb TCA. One well contains 20 ppb Freon and 9.0 ppb TCA. The remaining water supply wells are not accessible for monitoring by the discharger. None of the defined area water supply wells which are currently monitored contain more than 0.1 ppb 1,1-DCE. Eight water supply wells have been taken out of service and destroyed since the investigation began.

9. The discharger has installed more than 300 monitoring and extraction wells to aid in plume characterization, source control, and cleanup. At this time, the plume appears to be present in several aquifers and is adequately defined vertically. The plume measures more than three miles in length extending northwesterly from the discharger's property boundary past the intersection of Monterey Road and Capitol Expressway (Attachment 2) and is more than 180 feet in depth. Laterally, the plume is currently under significant hydraulic control. However, chemicals continue to migrate from shallow aquifers to deep aquifers which increases the concentrations of chemicals in the deeper aquifers.

10. The discharger may be required to perform additional plume characterization if monitoring results indicate that potential conduits may have transmitted chemicals to deeper aquifers. The discharger has identified several wells in the defined area which could be and have been potential conduits. These wells have been properly destroyed, are scheduled for destruction, or cannot be located.

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Plan (NCP) requirements for a remedial investigation and feasibility study (RI/FS). This comprehensive plan contains a proposed final remediation plan, proposed remediation levels, a remediation alternatives evaluation, water conservation plan, contingency plans for short term sub-basin management, and a public health evaluation. The final remediation plan is conceptual and provides a basis for remedial design.

16. Pursuant to the South Bay Multi-Site Cooperative Agreement and the South Bay Ground Water Contamination Enforcement Agreement, entered into on May 2, 1985, (as subsequently amended), by the Regional Board, EPA and DHS, the Regional Board has been acting as the lead regulatory agency. DHS and EPA have reviewed and commented on the draft comprehensive plan submitted by the discharger. The initial draft comprehensive plan and its revisions have been available for public review from December 1, 1986. During the time that the IBM site was a proposed NPL site, investigation and cleanup was regulated based on CERCLA and Health and Safety Code requirements. Since June 21, 1988, the IBM site has been proposed to become a RCRA site and be dropped from consideration as a NPL site. The Regional Board will continue to regulate the discharger's remediation and enforce under CERCLA as amended by SARA.

17. The discharger evaluated six alternative cleanup plans: 1) monitoring only, 2) protection of beneficial uses at drinking water supply wells, 3) protection of beneficial uses within the aquifer, 4) aquifer protection with a safety factor (assuming stable groundwater levels 5) remediation to background levels, and 6) aquifer protection with safety factor (contingency plans based on variable groundwater levels). Based on the alternatives evaluated, the discharger recommended alternative 6, as a final remedial action plan. The objectives of the plan are: 1) protect public health and the environment, 2) be technically feasible and 3) be cost-effective. The discharger proposes to continue groundwater remediation off site to concentrations below health-based drinking water criteria. The discharger's proposed plan, as modified by this Order, is adequate to comply with the Specifications, Prohibitions, and Provisions of this Order.

18. On July 21, 1988, the State Board adopted Resolution No. 88-88 which required that IBM and Fairchild remediation plans must result in beneficial use of, or recharge to the Santa Teresa Basin, of a significant amount of extracted groundwater. If use or recharge of significant amounts is not proposed for the period after January 31, 1989, the discharger must fully justify reasons for not using or recharging the groundwater. The justification must also demonstrate

why continued pumping is necessary from the standpoints of public health, protection of potential and present beneficial uses, maintaining high quality water, and providing the maximum benefit to the people of the State.

19. The discharger has evaluated the feasibility of reusing the groundwater resulting from the remediation activities. The discharger proposes to reuse the groundwater on site for shallow aquifer recharge, irrigation, and cooling tower water makeup flow and will optimize the reuse with a goal of reusing 100% of the total flow from on and off site. If an opportunity for additional reuse occurs, the discharger will evaluate that potential reuse based on the conditions set forth under the California Water Code Section 13550. The discharger proposes to treat off site groundwater by nozzles with no additional use prior to discharge to storm drains leading to Canoas Creek which flows into Guadalupe River to recharge shallow aquifers. Groundwater extraction and reuse may need to be modified in the future based on management of the basin and on the inherent uncertainties of yearly rainfall amounts and based on the performance evaluation to be conducted every five years after this order is adopted. Use of the treated groundwater for irrigation and recharge via injection wells shall be regulated pursuant to another Regional Board order.

The Regional Board intends to strongly encourage, and require to the extent allowed by law, the maximum reuse of extracted groundwater feasible either by the discharger or other public or private water users. Groundwater extracted from the Edenvale Gap should receive the highest priority of all offsite extraction for reuse consideration.

20. The discharger has based its evaluation of remediation alternatives and remediation levels on the Hazard Index concept. Hazard Indices have been calculated for both possible noncarcinogenic effects (NCHI) and possible carcinogenic effects (CHI). A NCHI value less than 1.0 indicates that all of the chemicals of interest found in B and deeper drinking water aquifers are present at concentrations equal to or below their relevant drinking water criteria. A CHI value of 1.0 indicates a maximum possible one in a million cancer risk from drinking two liters of water directly from the aquifer for 70 years. Department of Health Services (DHS) and the EPA have reviewed the discharger's proposed use of Hazard Indices and found that the indices appear to be justified for drinking water based on available data. These values may increase or decrease based on possible future changes in action levels or other safe drinking water standards for these pollutants.

From a public health threat perspective, the primary exposure route from the discharger's contamination is through ingestion of contaminated water. Based upon 1986 data, the maximum cancer risk due to potential consumption of untreated water from the A-aquifer zone is approximately 8×10^{-5} which a CHI of 80.0. This calculation assumes a worst case scenario in which a person weighing 70 kilograms drinks 2 liters of water daily directly from the A-aquifer zone in the IBM site over a 70 year period. Similarly, the contamination associated with non-carcinogen adverse health effects in the A-Aquifer zone on-site significantly exceed relevant drinking water criteria, with a maximum NCHI of 71.3. The A-aquifer zone does not currently supply drinking water and IBM installed institutional controls to prevent future exposure to A-aquifer zone water. Contamination on-site migrating downward to the lower drinking water aquifer warrants A-aquifer remediation.

21. On October 28, 1968, the State Board adopted Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California". This policy calls for maintaining the existing high quality of State waters unless it is demonstrated that any change would be consistent with the maximum public benefit and not unreasonably affect beneficial uses. This is based on a Legislative finding, contained in Section 13000, California Water Code, which states in part that it is State policy that; "waters of the State shall be regulated to attain the highest water quality which is reasonable". The original discharge of wastes to the groundwater at this site was in violation of this policy; therefore, the groundwater needs to be restored to its original high quality to the extent reasonable. Based on available information, as found in the discharger's technical reports "Draft Comprehensive Plan" dated June 1987 and revised October 1987 and "Draft Comprehensive Plan Supplement" dated April 1988 and revised July 1988, the change in water quality does not unreasonably affect beneficial uses and is consistent with the maximum public benefit as defined in State Board Resolution No. 68-16. This limited degradation would not exceed any established water quality policies; the remediation water quality levels proposed are well below current applicable health criteria; and the levels do restore the quality of the groundwater to the extent reasonable given technical and economic constraints. These constraints include the high additional incremental costs for removal of small amounts of additional pollutants and the need to minimize the removal of groundwater to achieve acceptable cleanup levels.

22. The remediation level for the B and deeper aquifers is 0.25 NCHI and 1.0 CHI as well as one fourth the noncarcinogen drinking water action level or health criteria for each non-carcinogen and the one in one

million risk concentration for each carcinogen. The level for the transmissive areas of the A aquifer is the drinking water action level or health criteria for each chemical. These remediation levels are at or below drinking water health criteria, action levels, and standards and will assure preservation of beneficial uses by maximizing the quality of groundwater to the maximum extent feasible. The soil remediation goal is 1 ppm for each pollutant; a goal is set due to the technical uncertainties associated with remediation of soil by means other than excavation which is no longer feasible due to prohibitive cost. These remediation levels may be attained within ten to twenty years. This goal will be re-evaluated based on chemical leachability test results for the soil and evaluation of pilot and full scale remediation efforts.

23. Based on historic water quality data for monitoring wells upgradient of and near Edenvale Gap, chemical concentrations are not expected to significantly increase in water supply wells in the undefined area. Remediation levels would be similar to concentrations (approximately 30 ppb each TCA and Freon) which flowed through Edenvale Gap and into the undefined area prior to plume interception during interim remediation. Concentrations in the Edenvale Gap wells will not be allowed to increase above 30 ppb each for TCA and Freon or 0.6 ppb 1,1-DCE.

In order to assure effective verification monitoring of groundwater leaving the defined area through the Edenvale Gap, a continuously pumping well needs to be monitored. This well must be screened in at least the B and C aquifers. The well must be located, and pumped at sufficient volume, to assure a capture zone representative of the groundwater passing through the Edenvale Gap.

24. If new information indicates remediation levels cannot be reasonably attained or can be reasonably surpassed, the Regional Board will decide if further final remediation actions beyond those completed shall be implemented at this site, based to a significant degree on the information developed pursuant to this Order. In accordance with the State Board Order No. 86-90 requirements, the Regional Board will base its decision on an evaluation of monitoring data obtained after temporary shutdown of extraction wells prior to permanent abandonment of extraction wells. If changes in health criteria, administrative requirements, site conditions, or remediation efficiency occur, the discharger will submit an evaluation of the effects of these changes on remediation levels specified in Specification B.3, 4 and 6 and on Table 1 and 2 of this Order.

The Regional Board recognizes that the discharger has already performed extensive investigative and remedial work onsite and offsite; and that the discharger is being ordered hereby to perform substantial additional remedial tasks. It is in the public interest to have the discharger undertake such remedial actions promptly and without prolonged litigation or the expenditure of public funds. The Board recognizes that an important element in encouraging the discharger to invest substantial resources in undertaking such remedial actions is to provide the discharger with reasonable assurances that the remedial actions called for in this Order will be the final remedial actions required to be undertaken by the discharger. On the other hand, the Board also recognizes its responsibility to protect water quality, public health, and the environment and that future developments could indicate that some additional remedial actions may be necessary. The Board has considered and balanced these important considerations, and has determined that the remedial actions ordered herein represent the Board's best, current judgment of the remedial actions to be required of the discharger. The Board will not require the discharger to undertake additional remedial actions with respect to the matters previously described herein unless: (1) conditions on the site, previously unknown to the Board, are discovered after the adoption of this Order, or (2) new information is received by the Board, in whole or in part after the date of this Order, and these previously unknown conditions or this new information indicates that the remedial actions required in this Order may not be protective of public health and the environment. The Board will also consider technical practicality, cost effectiveness, State Board Resolution No. 68-16 and the other factors evaluated by the Board in issuing this Order in determining whether such additional remedial actions are appropriate and necessary.

25. In accordance with the Health and Safety Code Section 25356.1, Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) this final remedial action plan is equivalent to a feasibility study, satisfies the requirements of the California Water Code Section 13304 and is protective of human health and the environment, attains Applicable or Relevant and Appropriate Requirements (ARARs), utilizes permanent solutions and alternative treatment technologies and resource recovery technologies to the maximum extent possible for short term effectiveness, is implementable, is cost effective, is acceptable based on State regulations, policies, and guidance, and reduces toxicity, mobility, and volume of pollutants, and addresses public concerns.

26. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 16, 1986. The Basin Plan contains water quality objectives and beneficial uses for South San Francisco Bay and contiguous surface and groundwaters.

27. Development of this final remediation action plan was based on the Regional Board's evaluation of seven years of water and soil quality data. Random samples have been collected and analyzed by the Regional Board to confirm the validity of data generated by the discharger. However, the data has not yet been validated using EPA validation guidance. The quality of this data has been taken into consideration and has been used in a manner consistent with the data's quality.

28. The existing and potential beneficial uses of the groundwater underlying and adjacent to the facility include:

    a. Industrial process water supply
    b. Industrial service water supply
    c. Municipal and domestic water supply
    d. Agricultural water supply

29. The discharger has caused or permitted, and threatens to cause or permit, waste to be discharged or deposited where it is or probably will be discharged to waters of the State and creates or threatens to create a condition of pollution or nuisance. Onsite and offsite final containment and remediation measures need to be implemented to alleviate the threat to the environment posed by the plume of pollutants.

30. This action is an order to enforce the laws and regulations administered by the Board. This action is categorically exempt from the provisions of the CEQA pursuant to Section 15321 of the Resources Agency Guidelines.

31. The Board has notified the discharger and interested agencies and persons of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.

32. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger shall cleanup and abate the effects described in the above findings as follows:

A PROHIBITIONS

1. The discharge of wastes or hazardous materials in a manner which will degrade water quality or adversely affect the beneficial uses of the waters of the State is prohibited.

2. Further significant migration of chemicals above remediation levels, as described in Findings 22 and 23, through subsurface transport to waters of the State is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of chemicals are prohibited.

B. SPECIFICATIONS

1. The storage, handling, treatment or disposal of soil or groundwater containing chemicals shall not create a nuisance as defined in Section 13050(m) of the California Water Code.

2. The discharger shall conduct monitoring activities as needed to define the current local hydrogeologic conditions, and the lateral and vertical extent of soil and groundwater containing chemicals. Should monitoring results show evidence of plume migration above remediation levels as described in Findings 22 and 23, additional plume characterization may be required.

3. Final remediation levels for chemical concentrations in any B or deeper aquifer well containing chemicals from the discharger's facility, shall be equal to or less than its Table 1 concentration and equal to or less than a NCHI of 0.25 and a CHI of 1.0.

   The NCHI is calculated as shown using denominator values as listed in Table 3.

$$\sum_{i=1}^{n} \frac{\text{(actual concentration of each chemical in ppb)}}{\text{(each chemical's Table 3 concentration in ppb)}}$$

The CHI is calculated as shown using denominator values as listed in Table 4.

$$\sum_{i-1}^{n} \frac{\text{(actual concentration of each chemical in ppb)}}{\text{(each chemical's Table 4 concentration in ppb)}}$$

Chemical concentrations shall not be found to equal or exceed Table 1 concentrations based on the moving annual average of analytical results as determined at the end of each quarter.

If the moving annual average in any quarter increases by 50% relative percent difference (RPD) from the previous quarter, which will be considered a baseline quarter, then the discharger shall inform the Regional Board of such an increase. After the first quarter following the baseline quarter, the second quarterly average is still 50% RPD above the baseline quarter and the concentrations are above final remediation levels, then a threatened violation is present and the discharger shall inform the Board of the causes of this threatened violation. If the third quarterly average is an increase of 50% RPD from the baseline quarter and concentrations are above final remediation levels then the discharger shall be considered to be in violation of this order and shall inform the Board of how and when the discharger will regain compliance.

If quarterly average concentrations increase above 30 ppb each of Freon-113 and TCA or 0.6 ppb 1,1-DCE, in wells ORBC-2, ORBC-3, 35-BC, 36-BCD, 37-BC, 40-BC, 38-BC, 39-BC, and 44-BC, the discharger shall inform the Regional Board of how and when the discharger will regain compliance.

4. Final remediation levels for each chemical concentration in the transmissive areas of the A aquifer shall be equal to or less than each chemical concentration as listed in Table 2.

5. The discharger shall optimize, with a goal of 100%, its use of the groundwater extracted from its groundwater cleanup activities to aid the cleanup and reduce the effect of water level declines.

6. The discharger shall remediate soil to a goal of 1 ppm for each chemical. This goal may be modified by the Regional Board if the discharger demonstrates with site specific data that higher levels of chemicals in the soil will not threaten the quality of waters of the State.

7. Compliance points shall be established at all monitoring wells which at any given time are outside the 0.25 NCHI and 1.0 CHI plume boundary.

8. The discharger shall maintain extraction wells ORBC-2 and ORBC-3 in operable condition until the remediation levels are attained throughout the entire plume area.

9. The discharger shall implement the final Remedial Action Plan described in Finding 17, as modified by this Order.

10. Interpretation of all the above specifications shall recognize the inherent constraints placed on the discharger's ability to control groundwater levels, and potential migration of chemicals of concern due to pumping by other groundwater users and the apparent hydrologic imbalance in the Santa Teresa Groundwater Basin. However, the discharger shall comply with this Order to maximum extent feasible.

C. PROVISIONS

1. The discharger shall submit to the Board acceptable monitoring program reports containing results of work performed according to a program prescribed by the Board's Executive Officer.

2. The discharger shall comply with this Order immediately upon adoption with the exception that the discharger shall comply with Prohibitions A.1., A.2., and A.3. and Specifications B.1., B.2., B.3., B.4, B.5., B.6., B.7., B.8. and B.9. above, in accordance with the following tasks and compliance time schedules:

   a. COMPLETION DATE: December 15, 1988

      TASK 1 - EDENVALE GAP WELL MONITORING
      Submit a technical report acceptable to the Executive Officer demonstrating effective monitoring of groundwater passing through the Edenvale Gap. This report shall at a minimum specify for an existing or proposed well, the well's location, screened interval, pumping rate, anticipated capture zone and proposed monitoring schedule. If a new well(s) is proposed, an installation and monitoring time schedule shall be included. The Executive Officer shall amend the Self-Monitoring Program attached to this Order to indicate when monitoring shall begin and its frequency.

b. COMPLETION DATE: December 15, 1988

TASK 2 - GROUNDWATER USE PLANS
Submit a technical report acceptable to the Executive Officer which contains a description of the groundwater use plans associated with the final remediation plan. The report shall include documentation of efforts to secure users for the water, reasons why potential users would not accept the water, and justification for why the pumped water cannot be used for beneficial uses or returned to the Basin. The technical report shall demonstrate how groundwater extracted from the Edenvale Gap will be reused, including specific uses and time schedules for implementation.

c. COMPLETION DATE: July 17, 1989

TASK 3 - IN SITU VAPOR EXTRACTION PILOT STUDY EFFECTIVENESS AND FULL SCALE PROPOSAL
Submit a technical report acceptable to the Executive Officer which contains an evaluation of the effectiveness of in situ vapor extraction pilot studies conducted in source areas on site. This evaluation shall address the feasibility of achieving the soil remediation goals as set forth in Specification 6 of this Order.

d. COMPLETION DATE: July 17, 1989

TASK 4 - "A" AQUIFER EXTRACTION WELL PILOT STUDY RESULTS AND PROPOSED BOUNDARY AND OFFSITE LOCATIONS
Submit a technical report acceptable to the Executive Officer which contains a description and results of the A aquifer extraction well pilot study and a remedial design proposal for full scale A aquifer extraction well locations. The report shall contain an evaluation of capture zone confirmation for each extraction well and a proposal for installation of extraction, piezometric, and monitoring wells. This report shall also include a Sample Plan which proposes well location, construction, development and monitoring schedule.

e. COMPLETION DATE: August 21, 1989

TASK 5 - ON SITE GROUNDWATER UTILIZATION
Submit a technical report acceptable to the Executive Officer which contains an evaluation of the irrigation,

cooling tower, and lake water use patterns and proposed use of extracted groundwater, including a projected range of volume, location, application, and seasonal rate of groundwater usage.

f. COMPLETION DATE: August 21, 1989

TASK 6 - CRITERIA FOR DECISION ANALYSIS OF FINAL PLAN IMPLEMENTATION AND CONTINGENCY PROPOSAL

Submit a technical report acceptable to the Executive Officer which contains criteria used to determine which plan, either the Remedial Action Plan (RAP), Contingency 2, or Contingency 1, shall be initially implemented as described in the discharger's "Draft Supplement Comprehensive Plan". These criteria shall be based on saturated thickness, rate of decline or rate of recovery of groundwater levels basin hydrologic balance within a range of storage or overdraft values, and the trend in stability of water levels at or near the site.

g. COMPLETION DATE: April 20, 1990

TASK 7 - "A" AQUIFER BOUNDARY AND OFF SITE EXTRACTION WELL INSTALLATION

Submit a technical report acceptable to the Executive Officer which contains a description of construction and implementation of the A aquifer boundary and off site wells.

h. COMPLETION DATE: February 19, 1992

TASK 8 - FINAL PLAN CONSTRUCTION COMPLETION

Submit a technical report acceptable to the Executive Officer which describes the construction and implementation of the final remedial action plan.

i. COMPLETION DATE: October 19, 1993

TASK 9 - FIVE YEAR STATUS REPORT AND EFFECTIVENESS EVALUATION

Submit a technical report acceptable to the Executive Officer containing the results of any additional investigation; an evaluation of the effectiveness of installed final remedial measures and remediation costs; additional recommended measures necessary to achieve final cleanup objectives; a comparison of previous expected costs with the costs incurred and projected costs necessary to achieve remediation levels and goals; and the tasks and time schedule necessary to implement any additional final remedial measures. The evaluation shall include, but need not be limited to, an estimation of the flow capture zone of the extraction wells, establishment of the cones of depression by field measurements, and presentation of chemical monitoring data. This report shall also describe the use of extracted groundwater and evaluate and document the removal and/or cleanup of polluted soils, if such removal and/or cleanup is an element of the remedial measures. In addition to regular groundwater monitoring data, on site soil samples shall also be collected, analyzed, and leachability tests performed to determine the effectiveness of groundwater and soil air extraction on saturated and unsaturated soil located on the site.

j. COMPLETION DATE: Two months after request by Executive Officer

TASK 10- "B" AND DEEPER AQUIFER EXTRACTION WELL INSTALLATION PROPOSAL
Submit a technical report acceptable to the Executive Officer which contains proposed extraction well locations in order to comply with Prohibition A.1., A.2., and A.3. and Specifications B.3.

k. COMPLETION DATE: one month after the end of each study

TASK 11 - ADDITIONAL PILOT STUDIES
Submit a technical report acceptable to the Executive Officer which contains a description of pilot study results, an effectiveness evaluation of the pilot study, a description of the methodology and basis of the pilot study approach and all other supporting information, in addition to field notes and laboratory originated data summary sheets.

l. COMPLETION DATE: two months after request made by the Executive Officer

TASK 12 - EVALUATION OF NEW HEALTH CRITERIA
Submit a technical report acceptable to the Executive Officer which contains an evaluation of how the final plan and cleanup levels would be affected, if the concentrations, as listed in Specification B.3., Tables 3 and 4 and used to

calculate Hazard Index numbers, change as a result of changes in source document conclusions or promulgation of drinking water standards or action levels.

m. COMPLETION DATE: four months prior to proposed implementation of extraction curtailment

TASK 13 - WELL ABANDONMENT CRITERIA AND PROPOSAL
Submit a technical report acceptable to the Executive Officer which contains a proposal for abandoning groundwater extraction wells and the criteria used to justify well abandonment. The proposal shall include temporary curtailment of extraction well operation for an extended period of time to study the effects on pollutant migration prior to well abandonment. This report should identify the method, specific monitoring wells, and the basis for the time frame to be used to determine that final cleanup levels have been reached and that the potential for increases above remediation levels in concentrations is minimal. This report shall include supporting data for and an evaluation of water quality in areas believed to be remediated.

n. COMPLETION DATE: 30 days after Regional Board approves curtailment.

TASK 14 - CURTAILMENT IMPLEMENTATION
Submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for Task 13.

o. COMPLETION DATE: 60 days after concentration increase is confirmed as provided in Specification 3.

TASK 15 - CONCENTRATION INCREASE EVALUATION AND RESPONSE PROPOSAL
Submit a technical report acceptable to the Executive Officer which contains an evaluation of the occurrence of concentration increases in extraction and monitoring wells as described in Specification B.3. In the event of noncompliance based on Specification B.3., the technical report shall contain an evaluation of the costs, benefits, and drawbacks of modifying active hydraulic cleanup and containment measures in comparison with a continued monitoring alternative. This technical report shall also include a proposal for a response to meet this Order's requirements.

p. COMPLETION DATE: 30 days after the Board determines whether additional active measures are appropriate.

TASK 16 - RESPONSE IMPLEMENTATION
Submit a technical report acceptable to the Executive Officer which documents the implementation of the proposal in Task 15 which will be implemented should pollutant concentrations increase in extraction and monitoring wells as provided in Specifications B.3 and B.7.

q. COMPLETION DATE: one month after release confirmation notification.

TASK 17 - PROPOSAL FOR REMEDIATION OF NEW RELEASES
Submit a technical report acceptable to the Executive Officer which contains a proposal for remediation of new releases onsite, and an implementation time schedule. This report shall evaluate the removal and/or cleanup of soil containing chemicals; evaluate alternative hydraulic control systems to contain and to remediate groundwater containing chemicals; shall be consistent with the final remediation plan and with the National Contingency Plan.

r. COMPLETION DATE: two months after request by Executive Officer.

TASK 18 - EVALUATION OF NEW TECHNICAL INFORMATION
Submit a technical report acceptable to the Executive Officer which contains an evaluation of new technical and economic information which indicate that remediation levels in some plume areas may be considered for revision. Such technical reports shall not be required unless the Executive Officer or Board determines that such new information indicates a reasonable possibility that the Order may need to be changed under the criteria described in Finding 24.

3. The submittal of technical reports evaluating additional final remedial measures will include a projection of the cost, effectiveness, benefits, and impact on public health, welfare, and environment of each alternative measure. If any additional remedial investigations or feasibility studies are found to be necessary, they shall be consistent with the guidance provided by Subpart F of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300), Section 25356.1 (c) of the California Health and Safety Code, CERCLA guidance documents, the State Board's Resolution No. 68-16, and this Order.

4. If the discharger is delayed, interrupted or prevented from complying with this Order or meeting one or more of the time schedules in this Order, the discharger shall promptly notify the Executive Officer. In the event of such delays or noncompliance, the Regional Board will consider modification of the time schedules established in this Order.

5. Monthly technical status letter reports on compliance with the Prohibitions, Specifications, and Provisions of this Order shall be submitted by the fifteenth of each month to the Regional Board commencing December 15, 1988 and covering the previous month. On a monthly basis thereafter, or as required by the Executive Officer, these reports shall consist of a report that, (1) summarizes work completed since submittal of the previous report, and work projected to be completed by the time of the next report, (2) identifies any obstacles of which the discharger is aware that may threaten compliance with the schedule of this Order and what actions are being taken to overcome these obstacles, and (3) includes, in the event of non-compliance with any Specification or Provision of this Order, written notification which clarifies the reasons for non-compliance and which proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of non-compliance on achieving compliance with the remaining requirements of this Order.

6. On a quarterly basis, or as required by the Executive Officer, monitoring reports shall include, but need not be limited to, updated water table and piezometric surface maps for all affected water bearing zones, and appropriately scaled and detailed base maps showing the location of all monitoring wells and extraction wells, and identifying adjacent facilities and structures. The self-monitoring plan for this Order may be changed, as needed, by the Executive Officer. Cross-sectional geological maps describing the hydrogeological setting of the site shall be provided in the first quarterly status report for each calendar year that this Order is in effect. If five or more new soil borings or wells are completed during any quarter, updated cross-sectional geological maps shall be provided in the quarterly report for that quarter.

7. All hydrogeological plans, specifications, reports, and documents shall be signed by or stamped with the seal of a registered geologist, engineering geologist or professional engineer.

TABLE 3

CONCENTRATIONS USED AS DENOMINATORS TO CALCULATE HAZARD INDICES NONCARCINOGENIC EFFECTS

Chemical	Concentration (ppb)	Source of Estimate
Chloroform	90	20% of EPA RfD[1]
Methylene Chloride (MC)	420	20% of EPA RfD
1,1-Dichloroethane (1,1-DCA)	20	DHS Action Level[2]
1,1,1-Trichloroethane (1,1,1-TCA)	200	DHS Action Level
1,1-Dichloroethylene (1,1-DCE)	6	DHS Action Level
1,2-Dichloroethylene (1,2-DCE)	16	DHS Action Level
Trichloroethylene (TCE)	52	20% of EPA DWEL[3]
Perchloroethylene (PCE)	136	20% of EPA DWEL
Freon 11	3,400	DHS Action Level
Freon 12	750	20% of EPA RfD
Freon 113	18,000	DHS Action Level
Toluene	100	DHS Action Level
Xylene	440	EPA Lifetime Health Advisory[4]
N-Methyl-2-Pyrrolidone	700	DHS Site Criteria[5]
Isopropanol	450	DHS Site Criteria
Acetone	700	20% of EPA RfD
Ethyl Amyl Ketone	123	DHS Site Criteria
Shell Sol 140	1,000	DHS Site Criteria

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[1] Environmental Protection Agency. 1987a. RfD denotes reference dose.

[2] Department of Health Services. 1987a.

[3] Environmental Protection Agency. 1985c.

[4] Environmental Protection Agency. 1985b.

[5] Department of Health Services. 1987b.

TABLE 2

TARGET REMEDIATION GOALS FOR THE A-AQUIFER ZONE

Chemical	Concentration (ppb)	Source of Goal
Methylene Chloride	40	DHS Action Level[1]
Chloroform	6.0	DHS Applied Action Level
1,1-Dichloroethane	20	DHS Action Level
1,1,1-Trichloroethane	200	DHS Action Level
1,1-Dichloroethylene	6	DHS Action Level
1,2-Dichloroethylene	16	DHS Action Level
Trichloroethylene	5	DHS Action Level
Perchloroethylene	4	DHS Action Level
Freon 11	3,400	DHS Action Level
Freon 12	750	20% of EPA RfD[3]
Freon 113	18,000	DHS Action Level
N-Methyl-2-Pyrrolidone	700	DHS Site Criteria[4]
Isopropanol	450	DHS Site Criteria
Acetone	700	20% of EPA RfD
Ethyl Amyl Ketone	123	DHS Site Criteria
Shell Sol 140	1,000	DHS Site Criteria
Xylene	440	EPA Lifetime Health Advisory[5]
Toluene	100	DHS Action Level
Benzene	0.7	DHS Action Level

[1] California Department of Health Services 1987a.
[2] California Department of Health Services 1986c.
[3] Environmental Protection Agency 1987a. RfD denotes Reference Dose.
[4] California Department of Health Services 1987b.
[5] Environmental Protection Agency 1985b.

TABLE 1

TARGET REMEDIATION GOALS FOR THE B- AND DEEPER AQUIFER ZONES

Chemical	Concentration (ppb)	Source of Goal
Freon 113	4500	0.25 x DHS Action Level[1]
1,1,1-Trichloroethane	50	0.25 x DHS Action Level
1,1-Dichloroethylene	1.5	0.25 x DHS Action Level
1,1-Dichloroethane	5	0.25 x DHS Action Level
Freon 11	850	0.25 x DHS Action Level
Trichloroethylene	3.1	10^{-6} Risk Level[2]
Chloroform	6.0	10^{-6} Risk Level
Methylene Chloride	4.8	10^{-6} Risk Level

[1] Department of Health Services 1987a.
[2] Environmental Protection Agency 1987a.

8. All samples shall be analyzed by laboratories certified to perform analysis on Hazardous Materials or laboratories using approved EPA methods or an equivalent method acceptable to the Executive Officer. The discharger shall request laboratories to follow EPA guidance "Documentation Requirements for Data Validation of Non-CLP Laboratory Data for Organic and Inorganic Analyses" dated May 1988 for preparation of data validation packages when required by the Executive Officer. All laboratories shall maintain quality assurance/quality control records for Board review.

9. The discharger shall maintain in good working order, and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.

10. Copies of all correspondence, reports, and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order, shall be provided to the following agencies:

    a. Santa Clara Valley Water District
    b. Santa Clara County Health Department
    c. City of San Jose
    d. State Department of Health Services/TSCD
    e. State Water Resources Control Board
    f. U. S. Environmental Protection Agency, Region IX

    Additional copies of correspondence, reports and documents pertaining to annual reporting of compliance with the Prohibitions, Specifications, and Provisions of this Order shall be provided for public use when requested by the Executive Officer.

11. The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:
    a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order.

    b. Access to copy any records required to be kept under the terms and conditions of this Order.

    c. Inspection of any monitoring equipment or methodology implemented in response to this Order.

d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.

12. The discharger shall file a report on any changes in site occupancy and ownership associated with the facility described in this Order.

13. If any hazardous substance is discharged in or on any waters of the state, or discharged and deposited where it is, or probably will be discharged in or on any waters of the state, the discharger shall immediately report such discharge to this Regional Board, at (415) 464-1255 on weekdays during office hours from 8 a.m. to 5 p.m., and to the Office of Emergency Services at (800) 852-7550 during non-office hours. A written report shall be be filed with the Regional within five (5) working days and shall contain information relative to: the nature of waste or pollutant, quantity involved, duration of incident, cause of spill, Spill Prevention and Containment Plan (SPCC) in effect, if any, estimated size of affected area, nature of effects, corrective measures that have been taken or planned, and a schedule of these activities, and persons notified.

14. The Board will review this Order periodically and may revise the requirements when necessary under the criteria in Finding 24.

15. Regional Board Order Nos. 84-90 and 88-45 are hereby rescinded.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on October 19, 1988.

Steven R. Ritchie
Executive Officer

Attachments:

TABLE 1 - Target Remediation Goals for the B- and Deeper Aquifer Zones
TABLE 2 - Target Remediation Goals for the A-Aquifer Zone
TABLE 3 - Concentrations Used as Denominators to Calculate Hazard Indices Noncarcinogenic Effects
TABLE 4 - Concentrations Used as Denominators to Calculate Hazard Indices Possible Carcinogenic Effects
SITE MAP

TABLE 4

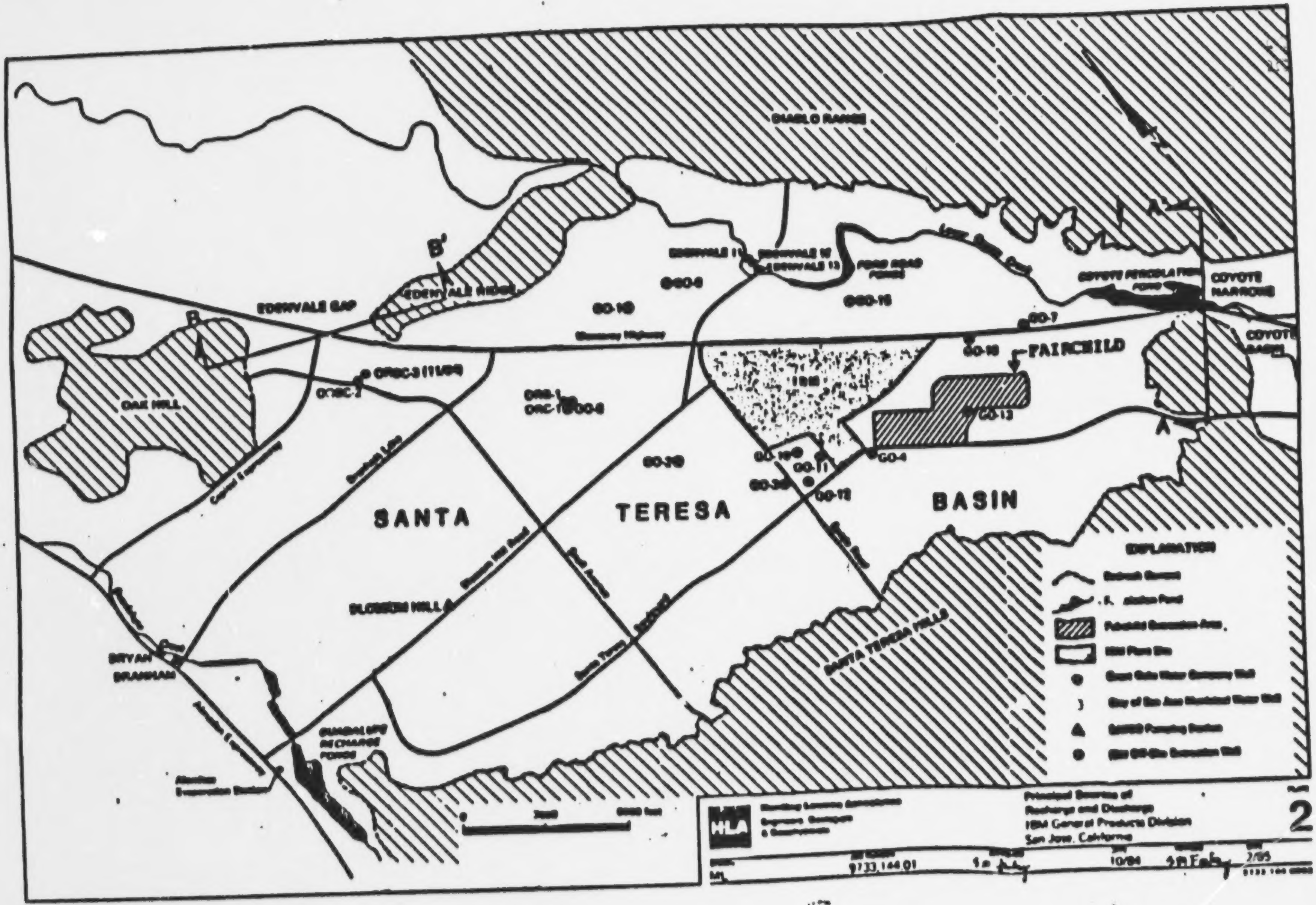
CONCENTRATIONS USED AS DENOMINATORS TO CALCULATE HAZARD INDICES POSSIBLE CARCINOGENIC EFFECTS

Chemical	DR[1] (ppb)
Methylene chloride	4.8
Chloroform	6.0
Trichloroethylene	3.1
Perchloroethylene[2]	0.67

---

[1] DR is the concentration of a chemical in drinking water that is predicted to increase cancer risk by one case out of one million individuals consuming 2 liters of water per day for 70 years, U.S. EPA Inegrated Risk Information System, April, 1987. These numbers are based on unit risk factors calculated by the EPA Carcinogen Assessment Group. They are theoretical upper bound risk calculations and do not represent measured cancer rates in humans or animals.

[2] The status of PCE is currently under review by EPA. It is included in this study as a B2 carcinogen.


DIABLO RANGE
EDENVALE RIDGE
B'
B
EDENVALE GAP
OAK HILL
EDENVALE 11
EDENVALE 12
EDENVALE 13
FORD ROAD PONDS
COYOTE PERCOLATION POND
COYOTE NARROWS
COYOTE
GO-6
GO-10
GO-15
GO-7
GO-16
FAIRCHILD
IBM
GO-13
GO-4
GO-11
GO-12
GO-20
DRBC-3 (11/84)
DRB-1
SANTA
TERESA
BASIN
A
BLOSSOM HILL
BRYAN
BRANHAM
GUADALUPE RECHARGE PONDS
SANTA TERESA HILLS
EXPLANATION
0
2000
HLA
IBM General Products Division
San Jose, California
2
9733,144.01
10/84
2/85

SITE MAP

PART 4

RESPONSIVENESS SUMMARY

APPENDIX C
RESPONSIVENESS SUMMARY

TATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY GEORGE DEUKMEJIAN Governor

DEPARTMENT OF HEALTH SERVICES
TOXIC SUBSTANCES CONTROL DIVISION
2151 BERKELEY WAY, ANNEX 7
BERKELEY, CA 94704

August 17, 1988

Steve Richie
Regional Water Quality Control Board
1111 Jackson Street, Rm 6040
Oakland, CA 94607

Dear Mr. Richie:

Tentative Orders for site clean-up and NPDES Permit for International Business Machines (IBM) - San Jose, Santa Clara County. File No.: 2189.8031(BAA). NPDES Permit No.: CA 0027961.

On review of the above referenced tentative Orders, NPDES permit, and documentation received in support thereof, the California Department of Health Services, Toxic Substances Control Division finds the Orders and NPDES permit substantially meets the applicable requirements of the California Health and Safety Code. Therefore, the Department hereby supports the tentative Orders and NPDES permit becoming final.

Sincerely,

Howard K. Hatayama
Chief, Site Mitigation Unit
Region II
Toxic Substances Control Division

HH:DLC:sj

8/15/88

HAZARD INDEX

Why is the Hazard Index used as a measure in determining fundamental water quality? The answer is because it gives us an immediate view as to how safe the water is to drink. Since it is defined as the ratio of concentration of chemicals existing in the water to the concentration which has been determined to be safe, it becomes a very useful tool in setting state policy.

It is useful to divide health effects of the chemicals which are found in water into at least two categories: noncarcinogenic effects and possible carcinogenic effects. The corresponding hazard indices may be referred to as the hazard index for noncarcinogenic effects (NCHI) and the index for possible carcinogenic effects (CHI).

The NCHI is calculated as the sum of ratios of measured water quality to relevant drinking water criteria:

$$NCHI = C_1/SL_1 + C_2/SL_2 + \ldots + C_n/SL_n$$

where C is the concentration of chemical actually found in the water, and SL is the safe level of that chemical based on DHS action levels or other appropriate health based criteria for noncarcinogenic effects. Thus if an NCHI is less than 1, the individual chemical concentrations are lower (better) than their respective drinking water criteria.

As CHI is calculated as the sum of the ratios of concentrations which exist in the water to the concentration which theoretically could cause a one-in-a-million incremental cancer risk if two liters of the water were (for e.g.) consumed every day for 70 years:

$$CHI = C_1/SL_1 + C_2/SL_2 + \ldots + C_n/SL_n$$

where C is as defined above but SL has the meaning in this equation of being the level which would create the one in a million incremental lifetime risk. For many risk calculations this is considered a deminimum risk and is therefore appropriate to be considered as the safe level.

IBM

International Business Machines Corporation

5600 Cottle Road
San Jose, California 95193

(408)-256-4467

September 9, 1988

HAND DELIVERED

CALIFORNIA REGIONAL WATER
SEP 10 1988
QUALITY CONTROL BOARD

Steven Ritchie, Executive Officer
Regional Water Quality Control Board,
San Francisco Bay Region
1111 Jackson Street, Room 6000
Oakland, CA 94607

Subject: IBM Comments on RWQCB Tentative Orders

Dear Mr. Ritchie:

Attached please find IBM's comments to your tentative orders for both the Site Cleanup Requirements and NPDES Waste Discharge Requirements for your review and consideration. Many of these have already been discussed with you or your staff.

I look forward to working with you and your staff to incorporate these comments into your orders.

Very truly yours,

Jane Andersen for H. Ray Kerby

H. Ray Kerby
Director, Environmental Programs
270-122

Attachment

cc: w/attachment

Belinda Allen - RWQCB (3 copies)

9 September 1988

COMMENTS ON RWQCB TENTATIVE ORDERS

I. SITE CLEANUP REQUIREMENTS TENTATIVE ORDER

REOPENER PROVISIONS

The proposed Order contains several provisions that relate to the possibility of future changes in the remedial action plan which IBM would be ordered to carry out. A number of these provisions refer to possible changes in the basic remedial goals established in the Order (Findings 18 and 21); several relate to possible modifications of the groundwater extraction and reuse program (Findings 17 and 21); others refer to additional site investigations, changes in the monitoring program, or reports to be submitted by IBM on possible changed remedial plans (Findings 9, Specification 2, and Provisions 2.r, 2.v and 6); and one relates to a five-year status report and effectiveness evaluation (Provision 2.q). In addition to these specific items, Provision 14 is a general section, saying that "the Board will review this order periodically and may revise the requirements when necessary."

IBM recognizes that the Board has responsibilities to protect beneficial uses of water and the public health and that a cleanup order should include reasonable reopener provisions so that the Board, and IBM, can respond appropriately to new developments. However, IBM believes it is also important for the Board to recognize that IBM, and other companies which will be presented with proposed final cleanup and abatement orders, need reasonable certainty regarding Order requirements as they commit to the substantial efforts and expenditures that will be involved in large remedial programs.

IBM has already performed extensive investigative and remedial work onsite and offsite. The proposed Order would direct IBM to perform many additional remedial tasks. It is in the public interest to have private parties, such as IBM, undertake these actions promptly and without prolonged litigation or the expenditures of public funds. Therefore, in situations such as this, where the site has been extensively studied and we are dealing with a final cleanup Order rather than an interim step, we believe an important element in encouraging companies to undertake the remedial actions is to provide them with reasonable assurances that the actions called for in the Order will be the final remedial actions required of the company.

Admittedly, it is difficult to balance this need for certainty with the need for some "reopeners" to permit adjustments reflecting future developments. In the federal Superfund process, this balance is usually achieved through a "Consent Decree," a contractual document that is approved by the Court and which contains a precise definition of the remedial actions and a specific reopener clause. IBM has submitted to the Staff a proposed form of Consent Order that could be

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used in lieu of the unilateral, Section 13304 Order format. We believe that the Consent Order approach is the best way to address the reopener issue and several other issues which are presented by the proposed unilateral SCR Order. We urge the Board to consider using a Consent Order format; however, we understand that the Staff's present intent is to utilize a unilateral Order.

In this light, we suggest that the Order should contain a specific Finding that discusses the policy issues addressed in this comment and establishes the context in which future changes to the Order will be evaluated.

We suggest the following new Finding:

> "The Board recognizes that IBM has already performed extensive investigative and remedial work onsite and offsite; and that IBM is being ordered hereby to perform substantial additional remedial tasks. It is in the public interest to have private parties undertake such remedial actions promptly and without prolonged litigation or the expenditure of public funds. The Board recognizes that an important element in encouraging private parties, such as IBM, to invest substantial resources in undertaking such remedial actions is to provide them with reasonable assurances that the remedial actions called for in orders such as this will be the final remedial actions required to

be undertaken by the Company. On the other hand, the Board also recognizes its responsibility to protect water quality, public health, and the environment and that future developments could indicate that some additional remedial actions may be advisable. The Board has considered and balanced these important considerations, and has determined that the remedial actions ordered herein represent the Board's best, current judgment of the final remedial action to be required of IBM and that the Board will not require IBM to undertake any additional remedial actions in respect to the matters described herein unless conditions on the site, previously unknown to the Board, are discovered after the date of this Order or information is received by the Board, in whole or in part after the date of this Order, and these previously unknown conditions or this information indicates that the remedial actions required in this Order are not protective of public health and the environment, and unless, after considering technical practicality, cost effectiveness, State Board Resolution 68-16 and the other factors evaluated by the Board in issuing this Order, the Board determines that such additional remedial actions are appropriate and necessary. The advisability of any other change to this Order, whether requested by IBM or the Board Staff or whether they arise from the five-year review described in Provision 2.q or otherwise, shall also be evaluated on the basis of these factors."

This language reflects the basic policy issues involved in developing an approach to "reopeners" and generally tracks the type of reopener language now recommended by EPA under CERCLA. Additionally, the language includes references to several specific factors because they are not expressly included in Section 13304, although we believe they are implicit in the overall structure and intent of the Water Code and the Board's role as lead agency for the IBM project.

Because the reopener issue would be dealt with in the recommended Finding, we suggest the following additional related changes to the Proposed Order:

1. Revise the first sentence of the second paragraph in Finding 9 to read as follows:

   "The discharger may be required to perform additional plume characterization if monitoring results indicate that potential conduits may have transmitted chemicals to deeper aquifers and if the Executive Officer or the Board determines that such results indicate a reasonable possibility that the Order may need to be changed under the criteria described in Finding _____ (the "Reopener" Finding)."

2. Delete the last sentence of Finding 17.

3. Delete the last sentence of Finding 18.

4. Delete Finding 21. (Note that the report requirements described in the last sentence of this Finding are dealt with in Provisions 2.r and 2.v below.)

5. Add the following sentence to the end of Provisions 2.r and 2.v:

   "Such technical reports shall not be required unless the Executive Officer or the Board determines that such new information indicates a reasonable possibility that the Order may need to be changed under the criteria described in Finding ___ (the "Reopener" Finding)."

6. Delete Provision 6.

7. Revise Provision 14 to read as follows:

   "The Board will review this Order periodically and may revise the requirements when and if necessary under the criteria described in Finding ____ (the "Reopener" Finding)."

The Staff Report also contains several statements regarding possible changes in the Order. See pages 8, 9, 10, and 12. If our suggested changes in the Order are made, the record should reflect that these comments in the Staff Report are superseded by the text of the Order itself.

JURISDICTIONAL MATTERS

IBM continues to be committed to cooperation with the Regional Board. These comments are being submitted in the same spirit. However, and for the record, IBM notes that it has not conceded that the Board has the basic jurisdictional power to issue the proposed Order under Water Code Section 13304. IBM believes that Section 13304(f) provides a basis for challenging the proposed Order. Additionally, Section 13304(a) authorizes an Order if the waste discharge "creates, or threatens to create, a condition of pollution or nuisance." IBM does not concede that its activities have created a present condition or threat of pollution or nuisance, as those terms are defined in the Water Code. Nonetheless, IBM is hopeful that it can continue to work with the Board in a cooperative, nonadversarial manner to address groundwater conditions in the vicinity of the IBM plant.

OTHER ITEMS

Finding 3: Onsite Chemical Usage

Freon 11 and 12 are not solvents. The term "organic solvents" in the second sentence should be replaced with "organic chemicals."

Finding 4

The second, third, and fourth sentences in Finding 4 contain conclusory language with which IBM cannot agree. IBM suggests that these sentences be revised to read as follows:

> "In November 1981, additional investigation revealed that these chemicals were found in nearby groundwater and a comprehensive, site-wide investigation program was initiated as requested by the Regional Board Staff. Other sources of potential releases of chemicals were found at the IBM site, including a possible source of Freon 113. Among the possible sources of releases, the discharger identified certain tank and pipeline failures and tank and sump overflows."

Additionally, and as a general comment, IBM objects to the use of terms such as "pollution" and "pollutant" in the proposed Order and the Staff Report to the extent that these phrases carry any implication that

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there is, or has been, any significant risk to public health or the environment.

Finding 6

The third sentence of Finding 6 suggests that the chemicals which may have been released from the IBM site are present in the area beyond Edenvale Gap. This is the so-called "Undefined Area". As IBM has previously stated, it does not believe such a conclusion is warranted. Although concentrations of certain of the chemicals may be found in the Undefined Area, it has not been established that these are from releases at the IBM site. Numerous other potential sources exist. Accordingly, IBM requests the deletion of this sentence.

In respect to the last sentence of Finding 6, IBM acknowledges that no other responsible party has yet been associated with the chemicals found in the area extending to the Edenvale Gap; but the Company reserves its right to identify and take appropriate action in respect to any party that becomes identified as a source of such chemicals.

Finding 8: Effects on Water Supply Wells

The second sentence should be revised as follows:

> "Some public and private drinking water supply wells have been affected ..."

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The third sentence should be revised to read:

> "...regular service from its water supply wells and drinking water supply from some private wells was discontinued, even though..."

The last sentence should be replaced by the following sentence:

> "One public drinking water supply well has been taken out of service and one has been destroyed since the investigation began."

Finding 11: Effects of Declining Groundwater Levels

The following paragraph should be added to Finding 11 to clarify the fact that IBM is not solely responsible for groundwater changes in the Santa Teresa basin:

> "Notwithstanding these reductions in the discharger's extraction rates, groundwater levels have continued to decline. Pumping and recharge activities within the Santa Teresa Groundwater Basin by others affects vertical and lateral hydraulic gradients and may impact plume migration control at the IBM site and offsite. Furthermore, the overall imbalance in the hydrologic budget for the Santa Teresa Groundwater Basin is beyond the sole control of IBM."

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Finding 14: Lead Regulatory Agency and Applicable Laws

The last sentence should be replaced with the following wording:

> "Even though, since 21 June 1988, the IBM site has been proposed to be dropped from consideration as a CERCLA site, the Regional Board will continue to regulate the remediation under CERCLA as amended by SARA."

IBM continues to believe that a clear confirmation of DHS and EPA concurrence with this Order and remediation plan is necessary. This needs to be the subject of further discussions between IBM and the involved agencies.

Finding 15: Alternative Plans Evaluated

We note that six alternative plans were evaluated, not five, and that Alternative 6 was recommended, not Alternative 5.

Finding 16: Groundwater Extraction and Reuse

The second sentence should be revised as follows to more accurately reflect State Water Resources Control Board Resolution No. 88-88:

"If use or recharge of significant amounts is not proposed for the period after January 31, 1989, the discharger shall fully justify reasons for not using or recharging the groundwater."

Finding 18: Hazard Indices

The statement "A NCHI value greater than 1.0 indicates that health effects may occur due to long term exposure" is inaccurate. In fact, no human health effects would be expected at concentrations hundreds of times higher than those resulting in a NCHI of 1.0. A more accurate statement should read that an NCHI of 1.0 indicates that all of the chemicals of interest found in the drinking water aquifers offsite are present at concentrations equal to or below (better than) their relevant drinking water criteria.

Finding 19

To clarify and complete the findings regarding State Board Resolution 68-16, we suggest that the last sentence of Finding 19 read as follows:

> "The proposed remediation levels, based on currently available information, are acceptable at this site given that the limited degradation which would be present at these proposed remediation levels would not exceed any established water quality policies;

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that the resultant water quality would be well below (i.e., better than) applicable health criteria; that some limited degradation has already occurred and cannot practicably be totally reversed; and that the proposed remedial levels would not unreasonably affect beneficial uses and are consistent with maximum public benefit. The proposed remediation levels are also consistent with the policy guidelines in Water Code Sections 13241 and 13000."

Finding 20: Remediation Goals for the A-Aquifer Zone

This finding should indicate that the remediation goals in Table 2 apply only to the transmissive areas of the A-aquifer zone. This is consistent with the goals proposed in the draft Comprehensive Plan and the draft Comprehensive Plan Supplement and recognizes the practical limitations of extraction from low-transmissive areas. Specific criteria for defining these areas will be included in relevant technical reports.

The second sentence of Finding 20 should be modified to read as follows:

> "The level for the transmissive areas of the A-aquifer ...."

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Finding 20: Remediation Goals for Soil (Also see Comment on Provision 2, Task 7)

The soil remediation goal should be 100 times the applicable DHS drinking water action level (DWAL) or equivalent (see Table 2 of tentative order) rather than 1 ppm for each chemical of concern. The 1 ppm (1 mg/Kg) goal appears arbitrary and not scientifically based on risk assessment and chemical-specific fate and mobility characteristics. For example, the 1 ppm goal appears to be inconsistent with other State and RWQCB guidelines for fuel leak cleanups. Furthermore, the soil remediation goal should be applied only in areas where there is a reasonable potential for exposure that may affect public health or the environment.

The risk assessment-based approach is discussed in Appendix G of the draft Comprehensive Plan, which has been favorably reviewed by the agencies. That discussion demonstrated that, at a level of 100 times the DWAL, exposure through inhalation of vapors from subsurface chemical concentrations and potential migration to groundwater were not expected to be significant; i.e., the soil remediation goal as proposed by IBM is consistent with other remediation goals for the site. This approach was previously recommended to the RWQCB (Kennedy/Jenks/Chilton letter of 22 July 1988 forwarded to RWQCB by IBM letter dated 25 July 1988).

The third sentence of Finding 20 should be revised to read as follows:

> "These remediation levels are at or below drinking water health criteria,....."

The fourth sentence of Finding 20 should be modified to read as follows:

> "The soil remediation goal is ~~1-ppm~~ 100 times the DHS drinking water action level (DWAL) or equivalent (see Table 2) for each pollutant in areas where there is reasonable potential for exposure that may affect public health or the environment; a goal is set..."

Finding 22

This Finding is intended to state that the Board has made the findings necessary to confirm that the remedial action plan is consistent not only with the provisions of the Water Code but also with applicable provisions of the Health and Safety Code (relating to remedial action plans) and with CERCLA's cleanup standards. We suggest these clarifications to the Finding:

> "In considering the final remedial action plan, the Board has considered not only the requirements of the California Water Code (including Section 13304) but also the requirements under the

California Health and Safety Code relating to remedial action plans and the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) relating to cleanup standards and compliance with the National Contingency Plan (NCP). The reports that have been submitted by IBM and reviewed by Staff and the Board are equivalent to the type of feasibility studies which are called for by Health and Safety Code Section 25356.1 and the NCP. After consideration of the factors and criteria that are relevant to actions under Water Code Section 13304, Health and Safety Code Section 25356.1 and Section 121 of CERCLA, the Board has determined that this final remedial action plan is protective of human health and the environment, attains applicable, relevant and appropriate requirements (ARARs), utilizes permanent solutions and alternative treatment technologies and resource recovery technologies to the maximum extent possible for short-term and long-term effectiveness, reduces toxicity, mobility and volume of pollutants, is implementable, is cost effective, and is acceptable based on the applicable state and federal regulations, policies and guidance."

Finding 25

IBM does not agree with the implication that a condition of "pollution" or "nuisance" has been created or threatened. Likewise, IBM does not concede that there is any significant threat to the environment posed by current conditions or that any further containment or remediation measures are necessary to alleviate any threat to public health or the environment.

Finding 26

In respect to compliance with CEQA or any other federal, state or local permitting rules which might otherwise be considered applicable to actions under the Order, IBM notes that Section 121(e) of CERCLA appears to provide a specific exemption from such requirements.

Prohibitions

All three of the proposed Prohibitions contain terms such as "degrade," "adversely affect" and "significant migration of pollutants above remediation levels." Standing alone, these phrases are too ambiguous and vague to be included in an enforceable Order, the violation of which could expose IBM to substantial penalties. In light of the many specific provisions and conditions in the Order, we suggest that the three Prohibitions are unnecessary and should be deleted. As a minimum, the Prohibitions should be clarified to indicate that the actions which would be taken by IBM under the Order and the achievement of the objectives of the Order would not constitute a violation of Prohibition 1. Also, the Order should be clarified to confirm that a "migration of pollutants" which does not constitute a "violation" under

Specification 3 would not be considered a "significant migration of pollutants above remediation levels" as defined in Prohibitions 2 and 3.

Specification 3: Remediation Goals for B- and Deeper Aquifer Zones (see also comment on Section C.1 of Groundwater Self-Monitoring Program)

The last sentence on page 7 in Specification 3 is not a complete sentence and should be clarified. Furthermore, calculating hazard indices for a calendar quarter is inconsistent with the health-based hazard index approach. All hazard indices calculated for the draft Comprehensive Plan have been based on annual averages and a minimum of 4 samples. This is consistent with the health-based objectives expressed in the draft Comprehensive Plan that evaluated potential chronic health effects assuming long-term (i.e., lifetime) exposure to low levels of chemicals in drinking water. This approach is consistent with EPA's requirements for monitoring VOCs in drinking water supplies on the basis of a running annual average of quarterly samples. Therefore, chemical concentrations to be used in hazard index calculations or with respect to Table 1 should be running annual averages calculated quarterly.

Incorrect table references are shown in the denominators in the equations for computing the Hazard Indices. For the NCHI calculation, the reference in the denominator should be to Table 3 and not Table 2. For the equation computing CHI, the reference should be to Table 4 instead of Table 3.

Specification 4: Remediation Goals for A-aquifer Zone

Specification 4 should be modified, as discussed above for Finding 20, to read as follows:

> "4. Final remediation levels for each chemical concentration in any well in the transmissive areas of the A-aquifer zone affected by pollutants from the discharger shall be equal to or less than the corresponding chemical concentration as listed in Table ~~1~~ 2."

Specification 5: Reuse Goal

IBM's goal of conserving water resources, as feasible and practical, will help reduce groundwater level declines. However, IBM's reuse (even if it were 100% of its groundwater extraction for remediation) will not offset the current basin overdraft such that groundwater levels will stop declining.

As discussed in our 25 July 1988 response to RWQCB's 8 July 1988 Comment (No. 5) on Section 4, IBM's historical groundwater extraction and water level data provide insight into the significance of the

9 September 1988

volume of IBM's extraction relative to the overall basin balance. IBM's 1,900 AFY reduction in extraction from 3,100 AFY (1983-1988) to 1,200 AFY (current) did not result in a significant recovery of water levels. This lack of response indicates that a similar contribution to the basin (i.e., IBM's reuse of up to an additional 1,200 AFY compared with the estimated total current pumping of about 20,000 AFY) would not have a significant effect on the basin water levels.

Specification 5 should be revised to read:

> "The discharger shall optimize, as feasible and practical, ~~with a-goal-of-50%,~~ its use of the groundwater extracted from its cleanup activities. ~~in-order-to-prevent-delays-in-cleanup-due-to water-level-declines~~ "

Specification 6: Remediation Goal for Soil

As discussed above for Finding 20, Specification 6 should be modified to read as follows:

> "6. The discharger shall remediate soil to a goal of 1 ppm 100 times the DHS drinking water action level (DWAL) or equivalent (see Table 2) for each chemical in areas where there is a reasonable potential for exposure that may affect public health or the environment."

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Specification 7: Compliance Points

Specification 7 should be replaced with the following, which includes a list of initial compliance wells:

> "7. Compliance points shall be at offsite monitoring wells within the B- and deeper aquifer zones, outside the 0.25 NCHI plume boundary. Initially (on the basis of the current plume configuration), the compliance wells will be:
>
> Edenvale Gap: 35-BC, 36-BCD, 37-BC, 38-BC, 39-BC, 40-BC, and 44-BC
>
> Lateral: 16-B, 15-B, 10-B, 18-B, 1-B, 7-BU, 7-BL, and 23-B
>
> Vertical: 29-C, 24-C, 20-C, 9-C, 5-C, 13-C, 4-C, 8-CU, 8-CL, 18-C, 7-C, 1-C, 2-C, 47-D, 9-D, 13-D, 2-D, 9-MD-186, 1-DU, 1-DL, and 11-C
>
> As the 0.25 NCHI plume changes size, the lateral and vertical compliance points will be moved, after RWQCB approval, to those existing wells immediately outside the 0.25 NCHI plume boundary and beneath the plume."

Table 4 of the Groundwater Self-Monitoring Program for the Tentative Order should be revised to reflect these changes in the compliance point wells.

Add New Specification 8

A new specification 8 should be included that reads:

> "8. Interpretation of all the above specifications shall recognize the inherent constraints placed on the discharger's ability to control groundwater levels, and potential migration of chemicals of concern due to pumping by other groundwater users and the apparent hydrologic imbalance in the Santa Teresa Groundwater Basin."

Provision C.2: Tasks

IBM submitted a proposed implementation schedule for the RAP or Contingency 2 remediation activities on Figure 8-7 of the draft Supplement dated April 1988. This figure presented IBM's projection of the timetable required for project implementation. However, the draft Tentative Order and draft NPDES Permit contain task submittal dates that represent significant reductions in the time available for implementation. IBM has concluded that the task schedule included in the draft Regional Board documents cannot reasonably be met given the

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typical needs of projects having similar complexity and permitting requirements.

Attached is a figure summarizing the time required for major project elements. Time is shown to cover necessary investigations, preliminary and final design, agency reviews and approvals, permitting, construction, and startup.

Interrelationships among major project tasks are also indicated. For example, it is prudent to complete final treatment facility design drawings after completion and review of the mid-1989 groundwater conditions evaluation to be submitted in a report due 21 August 1989.

On the basis of these considerations, the implementation schedule attached represents reasonable time frames for implementation of the necessary project facilities.

In addition, the RWQCB proposed completion dates for Task 1 (BAAQMD Application filed) and Task 7 (B- and Deeper Aquifer Extraction Well Installation Proposal) that place each task out of sequence. Each task is discussed separately below.

IBM believes that, under CERCLA Section 121(e), IBM may not be required to obtain a permit from the Bay Area Air Quality Management District for operation of the air stripping towers. However, IBM plans to work with this Board and the BAAQMD to ensure that the operation of these towers does not present any significant risks to health or the environment.

In the event a permit is necessary, the 21 November 1988 due date for Task 1 appears to be premature for filing a complete Bay Area Air Quality Management District (BAAQMD) application. Relatively detailed plans and equipment specifications typically must accompany such an application. These items will not be completed by November 1988. IBM will initiate liaison with the BAAQMD by 21 November 1988 and will submit the required applications, as necessary, in a timely manner consistent with the attached project schedule.

The proposed completion date (20 February 1989) for Task 7 is also premature. By this date, there will not be sufficient additional information on which to base further definition of extraction well locations and parameters. The extraction well installation proposal should follow the groundwater condition decision analysis scheduled for completion 21 August 1989 (Task 12), after the plan to be implemented initially has been determined.

Provision 2.1

As discussed above, CERCLA Section 121(e) appears to provide that a permit for irrigation use (or other reuse or recharge) of the extracted water is not required. Nevertheless, IBM intends to work with the

Board to review the substantive aspects of this matter to ensure that irrigation reuse (or other reuse or recharge) does not present any significant risks to health or the environment.

Provision 4: Completion Delays

Provision 4 should be replaced with the following:

> "4. If the discharger is delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the discharger shall promptly notify the Executive Officer; and if such delay, interruption or prevention results from a cause or causes beyond the reasonable control of discharger (including, with limitation, delays resulting from the time required for action by any governmental agency, equipment or delivery delays by third parties, strikes, or acts of God) the scheduled completion dates shall be extended to the extent made necessary by such cause or causes."

Provision 6: Quarterly Monitoring Reports

The last sentence should be revised to read as follows:

"Appropriate logs and cross-sections shall be presented in the relevant technical reports required by this Order."

Provision 11

This Specification purports to permit the Board, or its authorized representative, to obtain entry, access to documents, etc. IBM intends to continue cooperating with the Board and its Staff and to provide relevant data and records. However, this proposed Specification could, in some situations, exceed the power of the Board under Section 13267. IBM reserves its rights to challenge any requests by the Board or its authorized representative, to the extent they are not consistent with Section 13267. In any event, we suggest that subparagraph (d) of Specification 11 should be revised to add "in response to this Order" to the end of the paragraph.

Provision 13

In light of the provisions of Water Code Section 13271 (relating to notifications of hazardous substance discharges), IBM does not believe that there is any need for Specification 13. The Specification should be deleted. If the Specification is intended to impose any duties beyond those already required under Section 13271, we would appreciate knowing the rationale and statutory basis for this.

II. NPDES PERMIT TENTATIVE ORDER

Finding 6.B and Effluent Limitation A.3: Waste 003 Flow Rate

The flow rate for waste 003 may be as high as 2.5 MGD under final conditions (i.e., after the treatment systems become operational). For example, under recovering groundwater level (Contingency 1) conditions, Waste 003 flows of this magnitude could result if recharge is not feasible and other reuse options are not identified or if recharge wells are temporarily shut down. Thus, the 1.0 MGD flow limitation shown is inappropriate, especially as a daily maximum or instantaneous maximum. The flow rate limitation for Waste 003 should be revised from 1.0 MGD to 2.5 MGD for the final conditions.

Finding 6: Description of Waste 005

The penultimate paragraph (first paragraph on page 3) should be revised as follows:

> "Due to the high yield of groundwater from monitoring wells, low pollutant concentrations, scattered monitoring well locations, and the intermittent nature of the discharge, polluted groundwater, as described in Waste 005, produced from intermittent groundwater

sample collection from all aquifer zones, and aquifer testing of the B- and deeper aquifers will be untreated prior to discharge."

Replace the sentence in the original text that follows the above sentence with:

> "Because of the variability in aquifier test conditions (e.g., water quality and flow rate), treatment and disposal of groundwater produced from aquifer testing of A-aquifer zone wells will be considered on a case-by-case basis."

The maximum daily volume of groundwater produced from sampling the source- and plume-area A-aquifer zone monitoring wells that have concentrations exceeding the A-aquifer zone target remediation goals (which are generally much more stringent than the Waste 003 and 004 interim limits) is small compared with the total storm sewer discharge from the IBM site. Of the 21 *A-aquifer zone* monitoring wells sampled that currently have concentrations exceeding the target goals, 8 are sampled bimonthly (once every two months) and 13 quarterly. If the 12 wells with the largest purged volumes were sampled on the same day, their combined discharge would be approximately 800 gallons. Assuming these wells were sampled over a 10-hour period, the discharge would represent, under interim conditions, about 0.2 percent of the flow from

RA-2, RB-2, and RB-3 (about 600 gallons per minute, or 360,000 gallons over 10 hours).

Finding 12: Effluent Limits

The sixth sentence should be modified as follows:

> "Limits are subject to reconsideration when additional ~~information or final guidelines~~ or revised regulations are ~~available~~ adopted."

The last sentence should be modified to read as follows:

> "However, BAT in this case differs from other cases due to the higher flow rates ~~and~~ , low influent chemical concentrations, and treatment siting constraints."

Effluent Limitations A.2, A.3, and A.4: Oil and Grease Analysis

The oil and grease limitations should be revised to allow IBM, at its option, to monitor this parameter as oil and grease or a total organic carbon (TOC), rather than specifying oil and grease as TOC.

Effluent Limitations A.3 and A.4: Waste 003 and Waste 004 Instantaneous Maximum Limits for Inorganic Chemicals

The effluent limitations for some inorganic chemicals appear to be in the range of background levels for groundwaters in the Santa Teresa Groundwater Basin. IBM believes that it should not be responsible for effluent limitations that are beyond its control due to the natural environment.

Effluent Limitations A.4: Waste 004 Instantaneous Maximum Limits for 1,1,1-trichloroethane and Freon 113

The 40 ug/l effluent limitation for 1,1,1-trichloroethane (TCA) and for Freon 113 would be too low for an instantaneous maximum limit. The projected water quality for offsite wells presented in IBM's NPDES permit application and in the draft Comprehensive Plan Supplement is based on long-term average values. To account for the observed significant fluctuations from average concentrations, unknown concentrations in future offsite extraction wells, and possible fluctuations in spray nozzle treatment performance, the limits for TCA and Freon 113 should be set at or above 60 ug/l for each chemical.

Effluent Limitation A.7: Bioassay Testing

IBM requests clarification of the intent, design and protocols of "flow through 96-hour bioassays" for groundwater discharges, particularly at offsite locations. In addition, IBM requests that the relationship between these bioassays and the bioassay test program requested by RWQCB in its letter dated 12 August 1988 be clarified.

Receiving Water Limitations B.1 and B.2

It is unclear how receiving water limitations (e.g., dissolved oxygen, pH, temperature, etc.) apply to groundwater discharges routed through storm sewers. However, assuming that they do apply, receiving water quality should be judged on the basis of the concept of no net adverse impact, taking into account upstream water quality when appropriate.

Provision 6: Re-evaluation of Permit

The first sentence should be modified to read as follows:

> "This permit may be re-evaluated by the Regional Board prior to the expiration date after the time new regulations regarding non-point source discharges are adopted and implemented."

9 September 1988

III. GROUNDWATER SELF-MONITORING PROGRAM

Section C.1: Violations of Requirements

The first paragraph provides for increasing the frequency of sample collection and analysis. However, the provision for subsequent decrease in sampling frequency is not addressed (see following comment regarding C.3.d).

Consistent with remediation goals, the second paragraph should be modified as follows:

> "If ~~increases-of-more-than-10-ppb-of-either 1,1,1-trichloroethane-(TCA),-Freon-113,-or-more-than-2.5-ppb 1,1-dichloroethene-(1,1-DCE)-occur~~ a running annual average concentration exceeds a target remediation goal for the B- and deeper aquifer zones, or if a running annual average hazard index exceeds 0.25 NCHI or 1.0 CHI in a compliance point well, the discharger shall increase sample collection and analysis as follows."

The third paragraph (and Site Cleanup Requirement Specification Task 3) indicates that hazard indices will be based on calendar quarterly averages. Calculating hazard indices for a calendar quarter ~~is~~ inconsistent with the health-based hazard index approach. All hazard indices calculated for the draft Comprehensive Plan have been based on annual averages and a minimum of 4 samples. This is consistent with health-based objectives and the EPA's compliance monitoring requirements (running annual average of quarterly samples) for VOCs in drinking water. To provide meaningful quarterly information, running annual averages calculated quarterly should be specified.

C.3.d: Self-Monitoring Plan Revisions

Consistent with the 14 July 1988 Proposed Revisions, Phase II, IBM Self-Monitoring Plan, the following criterion should be added:

> "(6) Alter sampling frequency based on evaluation of collective data base."

To cover those cases of increase in sampling frequency as described in C.1, an additional criterion for SMP revision should be added:

> "(7) Following a temporary increase in sampling frequency, as described in C.1, the regular sampling frequency will resume after 4 samples show stable or decreasing concentrations (i.e., not increasing more than 50 percent RPD between samples)."

IV. RWQCB STAFF REPORT

Page 6: NCHI Calculation

The denominator of the equation calculating the NCHI should refer to Table 3 instead of Table 2. In the expanded equation shown at the bottom of Page 6, the denominator for TCE is 52 (rather than 5 as shown), which is the relevant criterion for noncarcinogenic health effects for TCE.

Page 7: CHI Calculation

The denominator shown in the equation at the top of Page 7 should refer to Table 4, not Table 3.

Page 9: Third Item Under "Implementation of the Draft Remedial Action Plan..." B- and C-aquifer Zone Extraction Well Clusters

As addressed in IBM's 22 July 1988 response to Item 6 of the RWQCB staff's letter of 6 July 1988 concerning the Proposed Remedial Action Plan, extraction from the C-aquifer zone will not prevent downward vertical chemical migration. It would, in fact, increase the leakage from the B-aquifer zone thereby spreading pollutants vertically downward, and would increase the hydrologic imbalance of the Santa Teresa Basin.

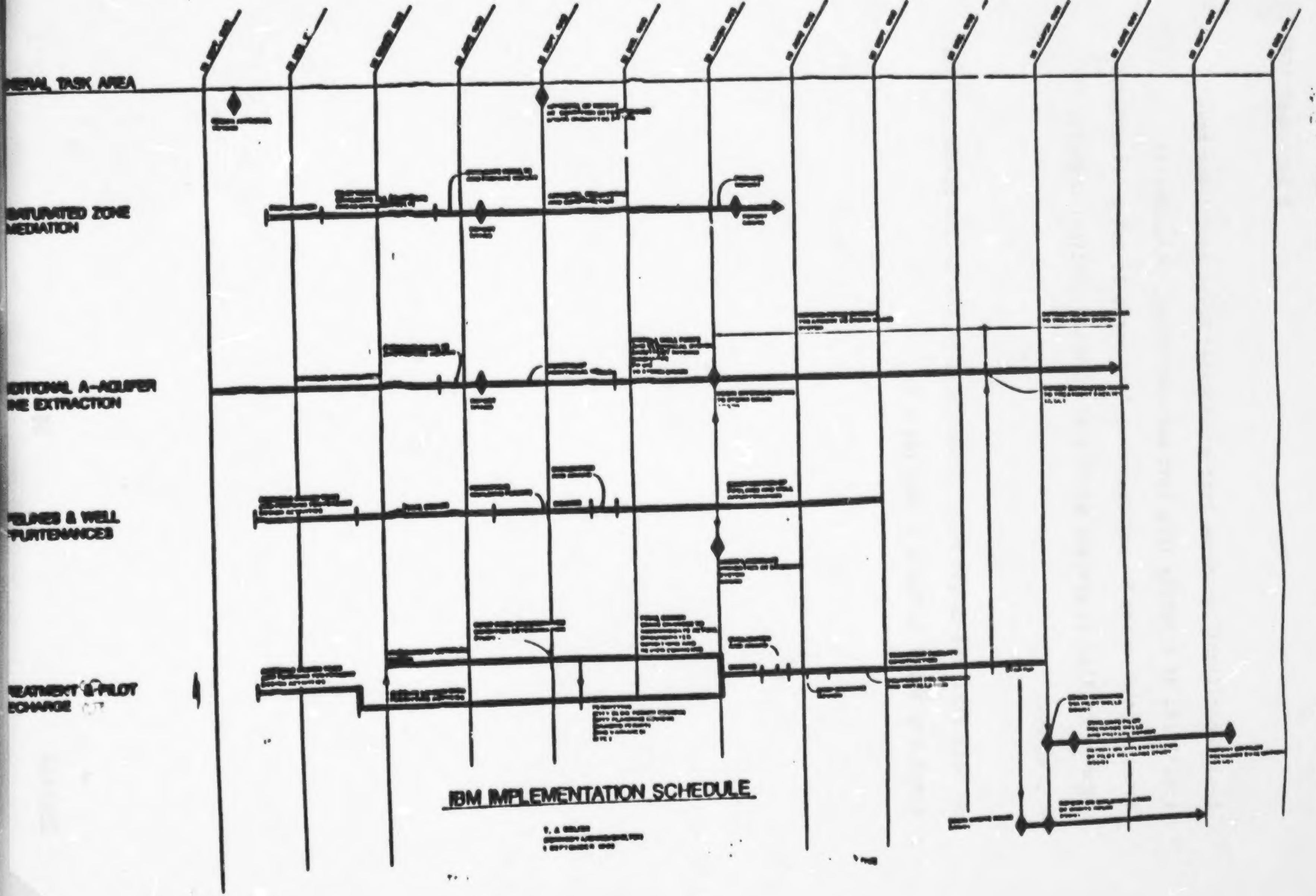
In the Santa Teresa Basin, water levels are higher in upper aquifer zones than in lower zones. The downward vertical hydraulic gradient is caused by large-scale groundwater extraction from the C- and deeper aquifer zones. Because this downward vertical hydraulic gradient exists between aquifer zones, groundwater in the upper zones has migrated and will continue to migrate to lower aquifer zones.

IBM alone cannot prevent downward vertical migration of groundwater. To reduce further vertical chemical migration, IBM has proposed to aggressively remediate the A- and B-aquifer zones both at the plant site boundary, at onsite areas, and offsite. By initiating additional remediation of groundwater in the A-aquifer zone, the source of chemicals to the B- and deeper aquifer zones will be controlled further by reducing vertical migration to the B- and deeper aquifer zones. Similarly, by remediating the 0.25 NCHI plume in the B-aquifer zone, continued vertical migration to the C- and deeper aquifer zones will be further reduced.

IBM would consider a slight revision of the RAP saturated thickness criterion to accommodate additional groundwater extraction in the B-aquifer zone if: (1) the Hazard indices increase and clearly threaten to exceed the cleanup goals in the C- and deeper aquifer zones, and (2) additional information collected by the Santa Teresa Basin Groundwater Management Task Force on groundwater level and groundwater basin conditions indicates that groundwater level conditions have stabilized at slightly less than RAP conditions. Groundwater extraction from the C- and deeper aquifer zones is not a recommended remedial action to prevent additional downward vertical chemical migration.

We note that the target remediation goals in the B- and deeper aquifer zones are shown in Table 1, not Table 2.

94



IBM IMPLEMENTATION SCHEDULE

KE ⓁBAA

✓

SEQUOIA AUDUBON SOCIETY INC.
SAN MATEO COUNTY, CALIFORNIA.
A chapter of the National Audubon Society

JET 8/16

CALIFORNIA REGIONAL WATER
AUG 15 1988
QUALITY CONTROL BOARD

August 11, 1988

Regional Water Quality Control Board
IBM - COMMUNITY RESPONSE
Attention: Community Relations Officer
1111 Jackson Street, Room 8
Oakland, CA 94607

Dear Community Relations Officer:

The Sequoia Audubon Society's Conservation Committee has reviewed the "IBM San Jose Superfund Site, Fact Sheet #3." This is in relation to the Proposed Final Cleanup Plan for IBM San Jose Site. The proposed plan lists six cleanup alternatives. *We favor #6: Achieve* better than safe drinking water levels (Aquifer Protection with Safety Factor assuming varying levels of groundwater in the aquifer). Alternative #6 is the best plan to ensure complete cleanup of toxins and to prevent them from entering drinking water.

Sincerely,

Gail Smithson
Vice President

SANTA CLARA COUNTY
MANUFACTURING GROUP

GARY BURKE
President

BOARD OF DIRECTORS

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Vice President and General Manager
General Electric

ROBERT FREEMAN
Vice President and General Manager
IBM Corporation

MARTIN GERSTEL
President and CEO
Alza Corporation

H. RICHARD JOHNSON
President and CEO
Watkins Johnson Company

ROBERT KOHLER
President
ESL Incorporated

JOHN C. LEWIS
President and CEO
Amdahl Corporation

SCOTT McNEALY
President
Sun Microsystems

W.J. SANDERS, III
President and CEO
Advanced Micro Devices, Inc.

Advisor to the Board
DAVID PACKARD
Chairman of the Board
Hewlett Packard Company

SV Voting Council Chair
LAJUNE BUSH
Hewlett Packard

August 17, 1988

Peter Snyder, Chairman
Regional Water Quality Control Board
1111 Jackson Street
Oakland, CA 94607

Dear Chairman Snyder:

The Santa Clara County Manufacturing Group consists of 90 companies located in Santa Clara County employing over 200,000 people. Employees and families of member companies number well over half a million people who live and work in this valley. We are vitally concerned with the health of our employees and all citizens as well as with the continued economic health of the community.

We support, with some reservation, the IBM plan.

In developing their cleanup plans our member companies have acknowledged their responsibilities by spending well over $200M to date, just in Santa Clara County, monies that would normally go to stockholders, employees and future investments. We have not asked for and do not want public funds for this purpose.

For several years the Clean Water Task Force, sponsored by the Manufacturing Group, has been involved in public speaking, testifying before key policy making groups, and publishing public education materials on cleanup issues in this county. We have been consistent in demonstrating that industry will do what is necessary to pursue rational cleanup plans (see attached principles).

Our efforts and progress are being hampered by the lack of specific goals, based on the best scientific and technical data, to guide our efforts. We are very concerned that in this plan these objective goals are still not apparent. What we see reflected in this plan is a subjective compromise rather than a set of goals based on good science. The presentation to the community on August 11 was filled with the tone that, while a Hazard Index (H.I.)=1 would protect the safety of the aquifer and the public, going to four times better was a good thing to do. The proposed order seems to fall short of providing IBM with clear attainment goals even based on the four times safer than necessary rules. This is

Suite 426 Santa Clara, California 95054 (408) 496-6901

evident in the paragraph which specifies that when that goal is reached at any point of time, the board will then decide if the goal should be changed. It is just not possible to build optimal plants to do the cleanup with this type of moving target. Our indistries recognize and agree with the need to modify goals when new information concerning health standards arise, but goals should not be changed arbitrarily.

We believe this plan has within it the ingredients for a policy solution to the unknown goals problem. Since the H.I. is defined to be the ratio of the concentration of the chemical which is present to the amount which is safe (see attachment on H.I.) it is the ideal route for the state and regional board to communicate uniform cleanup goals based on good science. Thus the state might choose a H.I. of unity as the appropriate guideline since this specifies that all sites will be cleaned up to the point of adquately protecting the environment. This allows flexibility for each site to modify its specific H.I. as a function of the specific geology, probability of contamination of drinking water supplies, etc. This local option might result in an H.I. greater than one or less than one.

Use of the H.I.=1 as a general guideline provides a way to balance the issue of water conservation with cleanup. If adopted there would no longer be a question at the state level that cleanup to a level of H.I.=1 is not a waste of the state's water resource. Setting such a goal would help to reduce the public's confusion about the appropriate balance between protection of the environment, health concerns, water conservation and cost. A H.I. of one is not in any sense a permission to pollute up to that level. We support tough standards to avoid any future contamination of the aquifer. At the same time we need to adopt rational policier for cleaning up contamination from past events which is already there from a wide variety of practices which we all thought were acceptable at the time. The lack of such a guideline leads us to ask the regional board "why is any water being pumped to achieve cleanup goals which are acknowledged to be four times safer than are necessary to protect health and the environment?"

We request that the board publish the amount of money that IBM will have to spend to achieve an H. I.=.25 versus a H.I.=1. We also request the Board publish the amount of water that will be pumped and dumped to achieve an H.I.=.25 versus an H.I.=1. We feel this will assist the public in understanding the board's priorities and trade-offs.

The second concern that we have with this plan is that there has been unreasonable time and cost to get to where we are. Part of the reason has been the lack of goals, part has been the overlapping multiple bureaucracy which is so complex that it costs over $2M to generate the necessary paper work to define a cleanup plan, and part is because we have decided the only appropriate decision process is that of consensus. While we accept the advantages of having a consensus, we see some real dangers with the consensus process as we have watched it work in developing this plan. It takes years to define all the engineering and technical parameters associated with a plan such as this and during this time the consensus as to what is best for the community is most likely to change as it has in the IBM plan. Our concern is that before the requisite plants and facilities for this plan can be built, the consensus is likely to change again. We need more leadership and less averaging of opinion in deciding these critical issues. This leadership needs to extend to informing the public that their interests are being protected.

Finally we must make a comment on the overall cost of this plan as it relates to the future of our other cleanup plans in the county. While this plan develops a rationale for choosing a H.I. of .25, the presentation on August 11 allowed the interpretation that the cost of H.I. of .25 is justified on the basis that IBM can afford it. We make a strong request that as we move into other final cleanup plans, the board focus on what is best for the health of the people and the protection of the environment rather than their judgment as to what a given company can afford. We would expect any guidelines which are developed would be applied evenhandedly to all of our contamination problems including gasoline tank leaks and home contamination sources.

We support the specific plan as presented. However, we hope our concerns will be taken into account as other plans are developed. We would be happy to work in cooperation with the board in further development of these ideas.

We have and continue to be a strong advocate for the leadership role of the RWQCB is Santa Clara County cleanup plans. Our comments are intended to be constructive and to contribute to an improved cleanup process.

Sincerely,

Gary Burke

Gary Burke
President

GB:lk
Attachments

CWTF GROUNDWATER CLEANUP PRINCIPLES

1) Companies accept their responsibility to protect public health and the environment.

2) Companies will complete a thorough investigation of contaminated areas.

3) Companies will comply with all applicable environmental statutes and regulations.

4) Cleanup programs will proceed with all practical speed consistent with timely decisions by the regulatory agencies.

5) Cleanup plans will be based on scientific information and cleanup techniques which balance risks, costs, and benefits.

6) Cleanup plans must contain measurable goals that state the requirements for the completion of cleanup activity in a planned, consistent manner.

7) Companies will inform and help educate employees and the community of cleanup plans, relative risks, and other related measures.

8) The best interests of the community are served by expending valuable resources on cleanup activity up to, but not beyond, what is necessary to protect public health and the environment.

9) Companies expect public officials to support cleanup plans based on good science that reflects the risks, costs and benefits to society.

10) Public agencies and officials must be proactive in public education on toxics. When cleanup plans have been defined which protect public health and the environment, the appropriate agencies must actively support and communicate this to the public.

Rev. 6/2/87

8/11/8

Comments on Proposed Final Cleanup Plan for IBM, San Jose Site

Submitted by: (Fill in name and address if you wish to receive a written response)

Name: Bob Gross - Director (408) 265-2600

Street Address: SC VWD - 5750 Almaden Exwy

City: San Jose State: Ca Zip: 95118

Community concern still remains, that is the question of potential blending of pumped water into existing water supplies.

There still lacks enough medical and technical evidence as to long range implications of chemical damage to human life (20 years?).

There is considerable lack of trust of big business and especially governmental statistics.

Material presented was either what business/government wants, not the public! –

Written comments may be submitted at the Public Meetings or mail to:

Regional Water Quality Control Board
IBM - COMMUNITY RESPONSE
Att: Community Relations Officer
1111 Jackson Street, Room 6000
Oakland, Ca 94607

✓

8/11/88

Comments on Proposed Final Cleanup Plan for IBM, San Jose Site

Submitted by: (Fill in name and address if you wish to receive a written response)

Name: Ron Coughlin

Street Address: 1435 Koll Circle, Ste. 111

City: San Jose **State:** CA **Zip:** 95112

AS A HYDROGEOLOGIST AND REMEDIATION CONSULTANT I FEEL THAT THE TREATED WATER CAN REACH A CLEANUP LEVEL WHICH WILL ENABLE IT TO BE USED AS A SOURCE FOR RECHARGE, RECLAMATION OR ANY OTHER REUSE. THE PUMPED WATER BEING DISCHARGED TO SURFACE WATERS AND ESSENTIALLY WASTED SHOULD BE EVALUATED BY IBM and the RWQCB and SCVWD.

I will offer my services to any such evaluation including getting public support.

Written comments may be submitted at the Public Meetings or mail to:

Regional Water Quality Control Board
IBM - COMMUNITY RESPONSE
Att: Community Relations Officer
1111 Jackson Street, Room 6000
Oakland, Ca 94607

✓

8-9-88

Regional Water Quality Control Board
IBM- Community Response
Atten: Community Relations Office
1111 Jackson Street, Rm 6000
Oakland, Ca 94607

BAA

CALIFORNIA REGIONAL WATER
AUG 10 1988
QUALITY CONTROL BOARD

TO: Community Relations office:

After reviewing Fact Sheet #3 regarding the IBM ground water clean-up plan I must agree with the RWQCB staff and say that I feel alternative number 6 as a final clean up plan is in the best interest of the residents in the area.

Thank you,
A concerned resident
Brenda Rochon
7024 Via Anacapa
San Jose, CA 95139

8/11/8

Comments on Proposed Final Cleanup Plan for IBM, San Jose Site

Submitted by: (Fill in name and address if you wish to receive a written response)

Name: Pat Ferraro SCVWD
Street Address: 351 Brookwood Dr
City: San Jose State: CA Zip: 95116.

SOIL CLEANUP — I.C. VADOSE ZONE (UNSATURATED)

- WILL VAPOR RECOVERY GO ON 10 YRS OR BEYOND IF 1 PPM IS NOT MET OR CONTINUE ONLY UNTIL RECOVERY LEVELS OFF.
- CAN STEAM INJECTION BE EVALUATED ON-SITE TO DETERMINE ACCELERATION CAPACITY OF SUCH A SYSTEM USED IN CONJUNCTION WITH A VAPOR RECOVERY SYSTEM INSTEAD OF VRS ALONE.
- CAN BIO-REMEDIATION BE USED TO ENHANCE ~~TO~~ ~~[illegible]~~ FINAL SOIL PARTICLE CLEANUP.

RE-USED TREATED WATER.

- HAS THIS AMOUNT BEEN MAXIMIZED EITHER BY ON-SITE USES, INJECTION OR OFF-SITE MARKETS.

- PROPOSED RANGE PROPOSED VARIES FROM 80% OF 0 TO 1900 GPM FOR RE-INJECTION. THIS DOES NOT APPEAR TO ADDRESS MAXIMUM CAPACITY FOR THE IBM SITE TO ACCEPT THROUGH INJECTION WELLS.

Written comments may be submitted at the Public Meetings or mail to:

Regional Water Quality Control Board
IBM - COMMUNITY RESPONSE
Att: Community Relations Officer
1111 Jackson Street, Room 6000
Oakland, Ca 94607

LEAGUES OF WOMEN VOTERS OF SANTA CLARA COUNTY

LOS ALTOS-MTN VIEW AREA
SAN JOSE-SANTA CLARA
CUPERTINO SUNNYVALE
LOS GATOS SARATOGA
PALO ALTO

CALIFORNIA REGIONAL WATER
AUG 11 1988
QUALITY CONTROL BOARD

August 9, 1988

Regional Water Quality Control Board
IBM - COMMUNITY RESPONSE
Attention: Community Relations Officer
1111 Jackson Street, Room B
Oakland, California 94607

Gentlemen:

The League of Women Voters supports comprehensive measures to provide maximum protection to human health and the environment from the adverse effects of hazardous materials. We believe an integrated approach should be taken to prevent harmful exposures through soil, surface, and groundwater contamination; bioaccumulation, air pollution, and direct contact. Cleanup of hazardous wastes should meet health based standards that include a margin of safety above the assessed risk. Maximum consideration should be given to the effects on the economy and employment. Minimal consideration should be given to costs or effects on the price of the product.

We have reviewed the Proposed Final Cleanup Plan for the IBM San Jose Site. Alternative No. 6, designed to clean up groundwater four times better than safe drinking water levels with provision for onsite reuse of cleaned up water has merit. The Hazard Index is a good approach for taking into consideration potential cumulative or combined effects of mixtures of pollutants, since it effectively lowers the permissible amount of each component as the number of pollutants increases.

The proposal also appears to be a workable solution to the problem of varying groundwater levels caused by drought or excessive rain over the twenty year period.

LEAGUES OF WOMEN VOTERS OF SANTA CLARA COUNTY

LOS ALTOS-MTN VIEW AREA
SAN JOSE-SANTA CLARA
CUPERTINO SUNNYVALE
LOS GATOS-SARATOGA
PALO ALTO

IBM should continue to look for ways to use the treated water both on and offsite, since the volume will undoubtedly exceed IBM's present water needs onsite. Reinjection onsite needs careful monitoring to make certain that it does not move the plume in ways to allow it to go offsite again. We assume that the monitoring wells are in place to assure that reinjection works as planned. If drought continues and water levels go even lower, it may be necessary to reconsider recharging the treated water into the percolation ponds, but unless conditions become really severe it is best to avoid doing that.

We are very concerned about the potential for Freon getting into the air during the aeration treatment of the water. Since Freon has become a worldwide upper atmosphere problem, every opportunity should be taken to prevent escape of any amount into the atmosphere. IBM should be required to carbon treat the air from airstripping operations to remove possible air pollutants even though the amounts are so small that with dilution they would not affect human health through breathing.

With proper monitoring and the addition of carbon treatment of stripped air, Alternative No. 6 appears to be a careful and appropriate cleanup proposal.

Sincerely,

Ann Clifton

Ann Clifton, Chair
County Council of the
Leagues of Women Voters
of Santa Clara County

Cupertino-Sunnyvale
Los Altos/Mountain View Area
Los Gatos-Saratoga-Monte Sereno

APPENDIX D
CORRESPONDENCE

IBM MAILING LIST

(1) State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95814
Attn: Gil Torres

Harding Lawson Assoc.
P.O. Box 578
Novato, CA 94948
Attn: Randy Stone

(2) USEPA
215 Fremont St.
San Francisco, CA 94105
Attn: Mary Masters

(3) Department of Health Services
Toxics Substance Control Division
2151 Berkeley Way, Annex 7
Berkeley, CA 94704
Attn: Howard Hatayama

(4) Santa Clara County Health Department
2220 Moorpark Avenue
San Jose, CA 95128
Attn: Lee Esquibel

(5) Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Attn: John T. O'Halloran
Tom Iwamura
Walt Wadlow

(6) IBM
5600 Cottle Road
San Jose, CA 95193
Attn: Ray Kerby

State of California

Department of Health Services

CALIFORNIA REGIONAL WATER
SEP 07 1988
QUALITY CONTROL BOARD

SPR

Memorandum

To :
Steven Ritchie
Executive Officer
California Regional Water Quality
Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6040
Oakland, CA 94607

Date : September 6, 1988

Subject: Additional Comments
Tentative Order for Site
Cleanup and NPDES Permit
for IBM, San Jose, Santa
Clara County W43-000
GWC-IBM

From : Catherine S. Ling for
Clifford L. Bowen, P.E.
District Engineer
Monterey District
Public Water Supply Branch

This is an additional comment to our August 29, 1988, memo regarding the Tentative Order for Site Cleanup and NPDES Permit for IBM, Site Cleanup Levels.

Our recommendation of applying the same level of Hazard Index at 0.25 for carcinogens has generated much discussion to where additional clarification is warranted. The Department concurs with the IBM proposed cleanup plan as well as the Regional Board Tentative Order that the proposed site cleanup levels of 0.25 NCHI and 1.0 CHI will not unreasonably affect the beneficial uses of the groundwater in the B and deeper aquifers. However, for the purpose of maximum public health protection, we would prefer that the same factor of safety, 0.25 HI, for non-carcinogens be applied for carcinogens present in the affected aquifers. We would like to point out two areas of concern in making the suggestion of using the 0.25 CHI. Our intent is to further assure that groundwater left in the affected aquifers be significantly less than the drinking water standards and action levels.

1. The NCHI and CHI only address the toxic effects of contaminants within their specific non-carcinogenic and carcinogenic groups and do not address the hazards when chemicals from each group are mixed together. There are unknown synergistic effects relating to mixtures of contaminants in drinking water. We believe that in the absence of concrete health effects data, a reasonable margin of safety should be used for both groups of contaminants in prescribing the Hazard Index.

2. The Hazard Indices used in the CHI may increase or decrease based on the future setting of drinking water standards and action levels (Reference source: Site Cleanup Requirements, page [illegible], Item #18). A ~~1.0~~ CHI could mean cleanup would be only to the drinking water

IBM MAILING LIST

(1) State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95814
Attn: Gil Torres

(2) USEPA
215 Fremont St.
San Francisco, CA 94105
Attn: Mary Masters

(3) Department of Health Services
Toxics Substance Control Division
2151 Berkeley Way, Annex 7
Berkeley, CA 94704
Attn: Howard Hatayama

(4) Santa Clara County Health Department
2220 Moorpark Avenue
San Jose, CA 95128
Attn: Lee Esquibel

(5) Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Attn: John T. O'Halloran
Tom Iwamura
Walt Wadlow

(6) IBM
5600 Cottle Road
San Jose, CA 95193
Attn: Ray Kerby

(7) Kennedy/Jenks/Chilton Consulting Engineers
657 Howard Street
San Francisco, CA 94105
Attn: Thomas Kalinowski

(8) Harding Lawson Assoc.
P.O. Box 578
Novato, CA 94948
Attn: Randy Stone

> standard for one specific chemical, if that was the only chemical detected. The Department feels that cleanup should be to levels well below the drinking water standards and, to the maximum extent possible, within reasonably technical and economical limits. This is consistent with State Board adopted Resolution 68-16 "Statement of Policy with Respect to Maintaining High Quality of Waters in California " as well as our Drinking Water Program's goal to assure that the water users are provided with the best quality of water supply available at all times. The drinking water standards and action levels should not be used to condone contamination up to those levels.

The Department's recommended 0.25 CHI is a goal to provide for the margin of safety in assuring that downstream water users are, to the extent possible, provided with the best quality of water available at all times.

cc: IBM Mailing List
Retail Water Agencies

Santa Clara Valley Water District

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600

DISTRICT BOARD OF DIRECTORS
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PATRICK T. FERRRO · DISTRICT 2
ROBERT W. GROSS · DISTRICT 3
JOE DONOHUE · DISTRICT 4
JAMES J. LENIHAN · DISTRICT 5
JOE JUDGE, VICE CHAIRMAN · AT LARGE
SIG SANCHEZ · AT LARGE

SUSAN A. PINO
CLERK OF THE BOARD

August 30, 1988

CALIFORNIA REGIONAL WATER
SEP 09 1988
QUALITY CONTROL BOARD

Mr. Peter W. Snyder, Chairman
Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6000
Oakland, California 94607

Dear Mr. Snyder:

The Santa Clara Valley Water District Board expresses appreciation for the Regional Board's lead role in oversight of the IBM and other groundwater pollution cases in our area. We also want to thank the Regional Board for coordinating the special workshop and hearing in Santa Clara County on IBM's proposed final cleanup plan.

Upon careful review, the District Board has adopted a Resolution which outlines the District's comments and recommendations on the proposed Tentative Orders to IBM for site cleanup and NPDES permit. We transmit a copy herewith.

The District is deeply concerned with and actively involved in protecting the integrity of the groundwater in Santa Clara County. The groundwater basins represent an important water resource which must be preserved. While complete cleanup of the existing IBM contamination to non-detectable levels is a desirable goal, the District recognizes that this is technically infeasible. The District also recognizes the need to strike a balance between pumping for groundwater cleanup to protect public health and the need to conserve the extracted water as a valuable resource.

With this balance in mind, the District supports the proposed cleanup plan (Alternative 6) with the amendments suggested by the Regional Board staff and by our District Resolution.

Two of the most critical issues to the District are the level of protection from further degradation afforded Region II (the undefined region) north of Edenvale Gap and the end use of the extracted waters. It is the District's understanding that past contaminant levels similar to those that would be expected to occur under the proposed plan moved through the Edenvale Gap without producing elevated contamination levels in wells located in Region II.

Our suggestion that the Regional Board strengthen the proposed plan as stated in the Resolution includes a request that IBM be required to increase the water reuse goal to 100%. The District will assist IBM in developing reuse markets with an option for District credit or refund for water that the District can accept and use within system operational constraints. Additionally, the District will develop a marketing strategy which prioritizes nonpotable reuse of the water followed by direct reuse or recharge into District facilities. The District will also seek grant monies that could be used to enhance the quantity of water that could be reused and requests your support in encouraging the State Water Resources Control Board to broadly define any such monies that could be made available.

The District looks forward to continued cooperation with the Regional Board in resolving the difficult issues associated with implementing an appropriate cleanup plan for IBM. To further this end, the District will continue to coordinate the Santa Teresa Subbasin Management Committee to provide input to IBM and the Regional Board on issues associated with cleanups in the subbasin.

We suggest that IBM's proposed remedial action plan, modified by the Regional Board staff's amendments in the draft order and incorporating our recommendations, will represent an appropriate application of the State's policy on Maintaining High Quality of Waters in California (SWRCB Resolution No. 68-16).

Sincerely,

Joe Pandit, Chairman
Board of Directors

Attachment

bc: SCVWD - Board of Directors (8/30/88 agenda)
J. O'Halloran
R. Esau
S. Pino
R. James
W. Wadlow

AT :RBJ:WW:scs

San Jose
Water
Company

374 West Santa Clara St.
P O Box 229
San Jose, CA 95196
408 279-7808

CALIFORNIA REGIONAL WATER
SEP 09 1988
QUALITY CONTROL BOARD

September 9, 1988

Mr. Peter W. Snyder, Chairman
Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6000
Oakland, CA 94607

RE: IBM Remedial Action Plan and Tentative Order for Site Cleanup.

Dear Mr. Snyder:

The San Jose Water Company appreciates the continuing efforts of your board and staff to oversee the final remedial action plan for the IBM groundwater contamination case. We also appreciate the public hearing and workshop held in San Jose for the purpose of informing and soliciting comments from the South Bay Community. This letter summarizes San Jose Water Company's comments on the proposed order for site cleanup.

Although there are many complex issues to be considered in the final remedial action plan, the overriding concerns of the water company are to 1) protect the Santa Clara and Santa Teresa Groundwater Basins as high quality sources of domestic water supply and 2) conserve the area's available water resources. The key issues to be considered are thus the groundwater cleanup goals and the conservation of pumped water used to achieve those goals.

Groundwater Cleanup Goals

We are generally in agreement with your staff's recommendation to pursue cleanup in accordance with alternative 6 (aquifer restoration to specific cleanup goals with pumping contingencies for responding to changing groundwater levels). It is our understanding that varying levels of groundwater in the Santa Teresa Basin will affect cleanup operations and that the most efficient and timely cleanup can be achieved by the careful management of pumping activities in response to available groundwater supplies.

Regarding the specific cleanup goals, we agree that cleanup in the B and deeper aquifers should proceed to the recommended 0.25 hazard index for non-carcinogens (NCHI). However, we concur with the Department of Health Services, Public Water Supply Branch that the same level of hazard index should be applied to carcinogens. Therefore, we recommend that the cleanup goal for carcinogens be a hazard index of 0.25 rather than 1.0 as proposed by your staff. This would assure that drinking water standards can be achieved in the Santa Teresa Basin with some margin for error. Recognizing that "zero level" cleanup goals are impossible to attain, this approach is both reasonable and protective of the beneficial uses of these aquifers.

Although we agree with the general approach to cleanup in the Santa Teresa Basin, we strongly support further requirements for extraction, monitoring and water quality goals at the Edenvale Gap. Such requirements would provide a mechanism to better evaluate cleanup performance in terms of containment within the Santa Teresa Basin and protection of the Santa Clara Basin.

As you know, the existing cleanup order limits to 10 parts per billion (ppb) the concentrations of the principal contaminants, TCA and Freon 113, that may be present in groundwater at the Edenvale Gap. The proposed order abolishes these limits in favor of the 0.25 NCHI in B and deeper aquifers. Since TCA is the primary component of the 0.25 NCHI calculation, it is reasonable to conclude that as a result of the new order up to 50 parts per billion TCA would be allowed to persist in the deeper aquifers of the Santa Teresa Basin.

In proposing the order, the Regional Board Staff concluded that the 0.25 NCHI cleanup goal would not result in degradation of groundwater in the Santa Clara Basin. This is based on the assumption that as groundwater flows toward the Edenvale Gap, there will be sufficient dilution to reduce levels of TCA from the maximum 50 ppb to 30 ppb or less. IBM has estimated that 30 ppb is the highest concentration of TCA ever passing through the gap, and that the 1 to 3 ppb TCA and Freon 113 observed in the affected Santa Clara Basin wells (five owned by the San Jose Water Company) are a result of this occurrence. They therefore conclude that levels of contamination will not increase in San Jose Water Company wells. While this logic is reasonable, it is our position that there must be adequate groundwater monitoring and specific water quality goals at the gap to demonstrate this level of containment. An appropriate goal would be something less than 30 ppb TCA, which if exceeded would trigger additional extraction of groundwater at the gap or other appropriate remedial action.

Monitoring at the gap should include samples from at least one continuously operated extraction well (such as ORBC3) in addition to the proposed aquifer-specific monitoring wells. The extraction well is capable of sampling a greater area within the gap and could be used to demonstrate ongoing compliance with "at-the-gap" water quality goals. Pumping rates in the range of 350 gpm (0.5 MGD) would probably be sufficient to achieve the desired

State of California The Resources Agency

Memorandum

To : Mr. Steven Ritchie
Executive Officer
Regional Water Quality
Control Board, Region II
1111 Jackson Street, Room 6000
Oakland, CA 94607

Date: September 7, 1988

BAA

CALIFORNIA REGIONAL WATER
SEP 08 1988
QUALITY CONTROL BOARD

From : Department of Fish and Game

Subject: Santa Teresa Groundwater Basin Cleanup Program

Fairchild Semi Conductor Corporation (Fairchild) and International Business Machines (IBM) have been engaged in a remedial cleanup program for the Santa Teresa Groundwater Basin. As part of this cleanup program, both Fairchild and IBM have pumped large quantities of groundwater with discharge to Canoas Creek, tributary to Guadalupe River. Due to increased flows to the Guadalupe River resulting from this discharge, instream habitat conditions have significantly improved and approximate historic levels.

Each year since 1986, chinook salmon and steelhead trout spawning has been documented in the Guadalupe River. In 1987, 247 spawning redds were observed. All but three of these were found below the Canoas Creek confluence.

It is the position of our department that the discharge of treated groundwater results in a beneficial use by supporting an anadromous fishery in the Guadalupe River. In addition, this discharge provides freshwater inflows to Guadalupe Slough which are essential to maintenance of rearing habitat for many estuarine fish species.

Upon request, further documentation can be provided which demonstrates the beneficial use of this treated groundwater discharge for fish and wildlife resources.

Please contact Michael Rugg, Associate Water Quality Biologist, at (707) 944-5521; or Linda Ulmer, Fishery Biologist, at (408) 458-0904.

Ken Aasen
for
Brian Hunter
Regional Manager
Region 3

cc: Belinda Allen
RWQCB - Oakland

Ray Kerby
International Business Machines

RESOLUTION NO. 88- 69

ADOPTING POSITION REGARDING PROPOSED REMEDIAL ACTION PLAN

RESOLVED by the Board of Directors of Santa Clara Valley Water District that the position of this Board regarding the Remedial Action Plan Proposed by International Business Machines is, and shall be reported to the San Francisco Bay Regional Water Quality Control Board, as follows:

Proposed Plan

Support Alternative 6 as amended by Regional Board staff.

Support 0.25 NCHI and 1.0 CHI in Region 1, unless health authorities determine that more stringent levels are necessary.

Additions to Proposed Plan

Request that Regional Board:

- Require adequate monitoring at Edenvale Gap and continued extraction of groundwater at or in the vicinity of ORBC-3 as necessary to prevent further degradation of water quality in the region downgradient from the Gap.
- Increase reuse goal to 100%.

Position on Reuse Alternatives

District will:

- Encourage maximum reuse of extracted waters by assisting in development of reuse markets with the option for District credit or refund for that water the District can accept and use within system operational constraints.
- Adopt a marketing strategy emphasizing a priority of:
  1. Landscaping, construction water and other nonpotable uses.
  2. Direct reuse or recharge into District facilities of adequately monitored water meeting treatment goals as defined in Regional Board draft cleanup order.
- Continue coordination of Santa Teresa Subbasin management committee.
- Seek grants to enhance reuse.

PASSED AND ADOPTED by the Board of Directors of Santa Clara Valley Water District this 30th day of August, 1988, by the following vote:

AYES: Directors J. DONOHUE P. T. FERRARO ~~R. W. GROSS~~ J. JUDGE
J. J. LENIHAN ~~J. PANDIT~~ S. SANCHEZ

NOES: Directors R.W.Gross, J.Pandit

ABSENT: Directors None

SANTA CLARA VALLEY WATER DISTRICT

By: ______________________
Chairman of the Board of Directors

ATTEST: ~~SUSAN A. PINO~~

Clerk of the Board of Directors

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monitoring. It is our understanding that this water could be conserved by providing sufficient treatment to make it suitable for recharge or direct use as domestic water supply. The San Jose Water Company would cooperate with the Regional Board and Department of Health Services to assure that water meeting all applicable health standards is put to additional beneficial use.

Conservation of Extracted Groundwater

As stated in our letter to Mr. Ritchie, dated July 13, 1988, it is the position of the San Jose Water Company that pumped groundwater from the IBM cleanup should be treated as necessary and put to additional beneficial use. This should be accomplished to the maximum extent feasible consistent with the appropriate public health standards and water quality criteria for the intended use. With this in mind, we recommend that the Board require IBM to increase the re-use goal from 50 percent to 100 percent of the extracted groundwater.

All extracted water is potentially useable for either recycling (reinjection into the aquifer), groundwater recharge, direct use or non-potable uses. To minimize the costs associated with treating and transporting this water, IBM should maximize non-potable use at it's own site. Additionally, we support the proposed order to require IBM to conduct a pilot study and prepare a proposal for full-scale reinjection of treated groundwater. It is our understanding that such recycling of extraction water may result in more efficient and timely cleanup and would lessen the impact of IBM's pumping on groundwater levels in the Santa Teresa Basin.

Treated water of a very high quality (less than 1 ppb total VOCs) can be obtained by air-stripping or granular activated carbon (GAC) treatment. Such water will surpass drinking water standards by a wide margin and could be made available for recycling, recharge or direct use for domestic supply. Although the treatment and conveyance of off-site extraction water may be subject to siting constraints, IBM should be required to provide the appropriate facilities wherever recharge or direct use is feasible. This includes construction of treatment facilities to be turned over to and operated by water purveyors or the Santa Clara Valley Water District.

A final comment on the issue of re-use is that adequate monitoring and quality assurance must be provided to demonstrate the performance of water treatment for the various re-use options. San Jose Water Company's position on re-use is based on the quality of water achievable as reported by IBM. Although treatment facilities may be turned over to the Water District or a water purveyor for operation and maintenance, construction and testing of facilities should be performed by IBM under the supervision of the Regional Board and Department of Health Services.

In concluding, it cannot be overemphasized that the Santa Clara Groundwater Basin is a vital source of supply for the San Jose Water Company and the 740,000 people we serve. This resource should be protected against contamination to the maximum extent possible within reasonably technical and economic limits. We therefore request that you strengthen the proposed order for site cleanup by adopting specific cleanup goals and requiring additional extraction and monitoring at the Edenvale Gap. We are prepared to work with your staff and the Santa Clara Valley Water District to assure that this and other extraction water is put to additional beneficial use, including recharge or direct use where it is feasible and appropriate.

The San Jose Water Company would be pleased to meet with you or your staff to discuss these recommendations. Thank you for the opportunity to comment on this important proceeding.

Very truly yours,

R.S. Yoo

R. Scott Yoo
Water Quality Manager

RSY:mh

cc: State Dept. of Health Services
Santa Clara Valley Water District

q. IBM should have the option of monitoring oil and grease limitations as either oil and grease or total organic carbon.

Response - Staff concurs and has modified the orders.

r. IBM should not be held accountable for effluent limitations that are beyond its control due to the natural environment.

Response - Staff concurs and routinely takes these kinds of factors into consideration when evaluating monitoring data, provided it can be positively shown what the natural conditions are. If IBM and staff differ in interpreting this, it can be decided in a public hearing before the Board. No change is therefore necessary in this order.

s. The 40 ug/l effluent limits for TCA and Freon are too low for an instantaneous maximum.

Response - After further review of the technical data submitted, staff concurs and has raised the instantaneous maximum to 60 ug/l and added a quarterly average limit of 40 ug/l in the Tentative NPDES Order.

t. IBM requests clarification of the flow through 96 hour bioassay.

Response - Staff will gladly work with IBM when it becomes necessary to install the bioassay monitoring equipment. The self monitoring program has been modified to require this test only at the on-site discharge point.

u. Receiving water limitations should take into account upstream water quality.

Response - See Response 9.r.

v. Change criteria on which an increase in sample collection and analysis is based.

Response - Staff concurs with using a running annual average for hazard indices but also believes specific concentration limits for certain chemicals should be retained.

w. Revise language regarding monitoring plan revisions and resumption of regular monitoring.

Response - Staff concurs with these suggestions and has incorporated them into the monitoring program, with one additional modification to limit resumption of regular monitoring only if the groundwater is in compliance with the SCR.

KEY CHANGES IN THE CLEANUP PLAN AS A RESULT OF COMMENTS

1. **Additional limits for the chemicals of concern, i.e. TCA, Freon and DCE, have been added for groundwater passing through the Edenvale Gap.**

2. The reuse goal has been raised from 50 to 100%.

3. **A requirement for a continuously pumping monitoring well at the Edenvale gap has been added. Reuse of groundwater from this well has been given the highest priority.**

obtain the permit. Should administrative matters delay the cleanup we will take appropriate actions to assure timely compliance.

i. Suggest removal of the proposed prohibitions in the SCR.

Response - These prohibitions are standard wording and are applicable to this cleanup. With regard to the claim that these prohibitions contain vague phrases, if in the future staff should determine that a violation has occurred and recommends enforcement to the Board, the Board in a public hearing would consider all relevant facts from the staff, public and IBM to decide whether a violation had occurred and the consequences as they apply to the particular case before it. In addition, day-to-day guidance from staff has been and remains available.

j. Chemical concentrations used in the Hazard Index calculation should be running annual averages calculated quarterly.

Response - Staff concurs that this is an appropriate means to determine compliance with the cleanup plan.

k. Remove goal of 50% reuse of groundwater.

Response - See Response 3.a.

l. Add specification that acknowledges the possible impact on groundwater levels of users other than IBM.

Response - This appears to be a reasonable request and it has been added.

m. Change task submittal dates.

Response - The task compliance submittal dates have been modified pursuant to this request.

n. Delete Provision 13, it is covered by Water Code Section 13271.

Response - This provision is standard language contained in all cleanup orders and is intended to implement Section 13271 on a site specific basis.

o. The flow rate limitation for Waste 003 should be revised from 1.0 to 2.5 MGD.

Response - This waste is groundwater from on-site wells which the remediation plan intends to be reused. Therefore reducing the allowable discharge after treatment works are in place is consistent with the overall goal of both the Regional and State Boards. Therefore, staff does not believe this request is appropriate.

p. Revise Finding 6 regarding Waste 005 to remove restrictions on disposal of groundwater from A aquifer on case by case basis.

Response - Since the A aquifer has the highest concentrations of chemicals, staff believes the restrictions contained in the SCR should remain.

provision for quarterly monitoring reports appears to be out of place in this section of the comments. Since this is standard language for cleanup orders staff does not believe it should be deleted in this case.

b. Urge Board to use Consent (rather than unilateral) Order format to address issues which may need to be reopened.

Response - Board orders are adopted, and modified, in public hearings where the discharger, Board members and staff, and other interested parties all have the opportunity to have input into the process. Therefore, we do not view Board orders as being unilateral. Additionally, an appeal process is available under State law.

c. IBM does not concede that the Regional Board has jurisdictional power to issue the proposed order.

Response - The staff position, which the Board has supported on numerous occasions, is that the issuance of Site Cleanup Requirements is the appropriate means of dealing with cleanups under the Water Code.

d. IBM does not concede that its activities have created a condition or threat of pollution, or a significant threat to the environment.

Response - The Board in prior orders has previously found that there is ample evidence that the discharge of chemicals at and from the IBM site has, and threatens to, adversely impact the real and potential beneficial uses of groundwater. Therefore, pollution and a threat to pollute do exist.

e. Indicate that there are other possible sources for chemicals in the area beyond Edenvale Gap.

Response - Staff agrees that there may be other, as yet unidentified sources beyond the Gap. However, we also believe that there is sufficient evidence that IBM has contributed to the chemicals found in this area.

f. Clarification that the Regional Board will continue to regulate the IBM cleanup, whether or not it is a CERCLA site.

Response - It is the Board's intent, as stated in the SCR, to do just that.

g. Soil remediation goals should be 100 times the applicable DHS drinking water standard.

Response - see Response 6.e.

h. IBM notes that CERCLA Section 121(e) appears to provide an exemption from compliance with CEQA and other permitting rules.

Response - Staff concurs that CERCLA does allow for exemption from the administrative aspects, but not the substantive aspects, of obtaining permits for on-site activities. We have chosen not to use this section of CERCLA for CEQA, and instead we are using an exemption that already exists under state law. In other cases, such as a permit from the BAAQMD, we believe the best way to assure compliance with the substantive portions of the permit requirements is to actually

j. Was land subsidence addressed in the plan?

Response - It was addressed in the remediation plan and found not to be expected.

k. Who is responsible if subsidence does occur?

Response - Subsidence is not expected. However, if it should occur, we believe the matter may have to be decided by the courts after determining who caused it and what damages occurred because of it.

l. Strike the enforcement paragraph in the Plan, it has IBM policing itself.

Response - Self monitoring has been, and is, the standard practice for insuring compliance with all Regional Board orders. With routine and spot checking by Board staff, we have found this to be a satisfactory, useful, and efficient method of determining compliance with all the orders issued by the Board.

l. Board should require IBM to bring in surface water to inject at the property line in order to contain the pollutants on their property.

Response - Staff believes that in the long run it is better to remove the pollutants from the groundwater rather than attempt to contain them. Also, pollutants have already migrated beyond the property boundary.

IBM COMMENTS

8. EDITORIAL COMMENTS

Editorial comments (e.g. typographical errors, clarifications, etc.) have been incorporated into the cleanup plan and orders in those cases where the intent of the cleanup plan has not been changed. Any changes that impact the actual cleanup program are described below.

9. NON-EDITORIAL COMMENTS

a. Grounds for reopening the remediation plan for further Board review or action need better definition.

Response - Staff accepts, with modification, IBM's proposal for a general policy statement regarding future changes in the cleanup plan. This will be included in the SCR as a finding. The staff modification to the proposed language is to clarify that any changes would be based on either newly discovered site conditions or other information not available to the Board at the time of adoption of the remediation plan.

Staff does not believe that the other changes proposed by IBM to go along with the above policy statement are appropriate. Some suggested specific deletions of grounds for modifying the remediation plan are contrary to the 'other information' portion of the policy statement. Also, requiring that changes in the monitoring program, technical evaluations, or periodic Board review be limited to conditions listed in the policy statement is too restrictive of the Board's responsibility to protect water quality. Finally, the request for deletion of the

c. If Technical Assistance Grants are not available, IBM should be encouraged to put up an equivalent amount of money.

Response - This would have to be negotiated between IBM and community groups. The Board has no authority to require this.

d. There are no precise recharge capacity estimates.

Response - The remediation plan calls for submitting detailed groundwater reinjection plans by January 1990. These plans should include these estimates.

e. The Board should investigate ways to limit paperwork associated with developing cleanup plans.

Response - The Board staff attempts to limit the paperwork as much as is allowed under the various state and federal laws which it is required to enforce. Utilizing one report to satisfy the three regulatory agencies is one method the Board has chosen to reduce paperwork. Submittal of complete reports by dischargers would help eliminate much of the correspondence involved in developing acceptable cleanup plans.

f. There should be more leadership and less averaging of opinions in deciding critical issues.

Response - When deciding critical issues it is important that all opinions be heard and considered. We believe the Board is taking an active leadership role in this issue given the legal constraints imposed upon it.

g. Board should develop more and better public education materials, particularly with regard to public safety and risk.

Response - The Board is doing what it can given the limited resources in this area. We have issued, and plan to continue doing so, public fact sheets on Regional Board lead CERCLA sites as final cleanup plans are developed and considered for adoption.

h. How long until treatment systems are built and in operation?

Response - The schedule contained in the remediation plan and SCR is:

Offsite:
treatment design - January 1989
treatment operational - August 1989

Onsite:
treatment preliminary design - March 1989
treatment final design - October 1989
treatment operational - June 1991

i. To what degree was Plan 6 authored by IBM?

Response - Plan 6, "the remediation plan", was originally drafted by IBM. However, the final plan has been modified by Board staff.

6. SOIL CLEANUP

a. Steam injection will work with vapor recovery.

Response - The remediation plan did evaluate several methods of soil remediation, including steam injection and bioremediation. The plan concluded they were technically not applicable to this site (e.g. heat treatment with steam injection, since it is an unproven technology) or that they were of limited applicability (e.g. bioremediation). Soil remediation techniques which were chosen include soil removal, which has already been accomplished, and vapor extraction.

Detailed plans, based on current pilot studies, for soil cleanup by vapor extraction are due under this remediation plan by January, 1989. If the current proposal proves unable to reach soil cleanup goals, then additional technologies will have to be investigated.

b. How is the soil going to be cleaned up?

Response - 23,000 cubic yards of contaminated soil have already been removed from the areas with the highest concentrations of chemicals. For the remaining soils which contain chemicals above the cleanup goals, the remediation plan calls for soil vapor extraction wells to be installed.

c. Have alternative soil cleanup methods, such as steam injection, been evaluated?

Response - See Response 6.a.

d. Can bio-remediation be used to enhance soil cleanup?

Response - See Response 6.a.

e. The soil cleanup goals should be 100 times the applicable drinking water standard.

Response - The proposed goal may not be adequate to protect drinking water resources, depending on the nature of the interactions between the chemicals and the soil. Therefore the SCR contain a more conservative limit of 1 ppm, but allows IBM to request a higher number if it can prove no adverse impacts on the groundwater (e.g. lack of mobility of the chemicals in the soil).

7. MISCELLANEOUS

a. Proper monitoring should be performed.

Response - Both the SCR and the NPDES Permit (for surface water discharge) contain extensive monitoring programs. In addition, Board staff will be doing periodic compliance inspections throughout the cleanup process. Also see 1.b.

b. IBM should remain a proposed CERCLA site.

Response - Board staff agrees with this position and has so informed the EPA. However, the final decision rests with EPA.

e. How soon will you evaluate the effectiveness of the scrubbers?

Response - The BAAQMD requires that any air pollution control equipment go through their permitting process prior to being built. Therefore the scrubbers will be evaluated prior to being installed or operated.

f. What problem would there be in putting the scrubbers on the air strippers before the air strippers are up?

Response - Technically this would not be a problem. However, see Response 4.a. regarding whether it is necessary.

g. Will vapor recovery go on 20 years or beyond if 1 ppm is not met, or will it continue only until recovery levels off?

Response - Vapor recovery will continue as long as it is effective in removing chemicals from the soil and until either the cleanup goals are met or alternative goals are set by the Board based on threat to water quality (see Response 6.e.).

5. COST

a. Cost relative to hazard index and amount of water should be published.

Response - This information is in the administrative record which is available for public review.

b. Multiple bureaucracies cause delay and increase costs.

Response - Regional Board staff, acting as the lead agency in this case, has attempted to do what it could to expedite this cleanup process. However, other agencies, local, state, and federal, all must make sure that their own laws, regulations, and requirements are complied with, and this does sometimes cause delays.

c. IBM should spend whatever it takes to restore the groundwater.

Response - State law and policy requires cleanup actions to be reasonable, and one aspect of reasonableness is cost. Also, one of the criteria under CERCLA for choosing a final cleanup plan is cost. Based on these state and federal requirements, costs are considered when choosing a final plan.

d. Board should focus on what is best for public health and the environment, not on what a company can afford.

Response - The remediation plan will protect public health, based on known standards, and can be changed if the health standards change. The cleanup goals include a significant safety factor. Costs were considered when deciding cleanup goals beyond those needed to protect human health. Also, see Response 5.c.

e. Is IBM paying for all the water they are pumping out of the ground?

Response - IBM is paying the Santa Clara Valley Water District for all extracted groundwater.

measures when groundwater levels are falling, which is what happens during drought conditions.

q. Is there any intent to force the SCVWD to blend reused water into existing water systems?

Response - See Response 3.i.

r. What objection does the SCVWD have to discharging treated groundwater into their percolation ponds?

Response - District staff did note certain management and technical difficulties with the proposal to discharge to the percolation ponds, however there is no formal objection from the District at this time if the groundwater is sufficiently treated. The primary obstacle to this proposal are the costs of treating and transporting the groundwater.

s. How much of the system for piping treated groundwater to markets is IBM going to pay?

Response - See Response 3.c. Also, these matters would have to agreed to between IBM and the user of the water.

4. AIR EMISSIONS

a. Should require air scrubbers.

Response - For questions on whether air scrubbers, or any other method of air pollution control equipment, will be needed, Regional Board staff will be relying on the Bay Area Air Quality Management District's (BAAQMD) permit program to assure protection of public health and the environment. This cleanup plan requires IBM to obtain the proper permits from the BAAQMD. In addition, the cleanup proposal did address the potential health impacts of air emissions from groundwater treatment units and found them to be insignificant. Also see Response 2.b.

b. Don't allow Freon emissions into the air (to protect ozone layer)

Response - See Response 4.a.

c. What happens to material that is volatilized when treating water? Is it released to the atmosphere?

Response - Any treatment using air stripping, as is proposed in this case, will release chemicals to the air unless further treatment is required. As noted in 4.a. above we are relying on the BAAQMD to decide whether further treatment is needed.

d. Do you add together all nearby sources of air pollution when determining what standards are appropriate to meet?

Response - BAAQMD procedures do take this into consideration.

i. Treated groundwater should not be blended into existing water supplies.

Response - As long as the water is sufficiently treated to meet the concerns of the Department of Health Services, which regulates water supply systems, and the water purveyors, the Regional Board has no objections to blending treated groundwater into water supplies. Also see Response 3.c.

j. Don't put any unclean water into the underground basin.

Response - The remediation plan calls for treating any recharged groundwater to an average of less than 1 ppb. Current technology does not allow for any stricter requirements.

k. Stop discharging water to Canoas Creek.

Response - Prior to complete reuse of extracted groundwater, discharge to surface water is the most reasonable option available. The NPDES permit to be adopted as part of this remediation plan is designed to assure protection of the beneficial uses of Canoas Creek. At this time, based on several years of existing data, there is no indication that there would be any adverse impacts if this portion of the cleanup plan is complied with. Also, note comment 3.l. below.

l. Discharge of treated groundwater to Canoas Creek is beneficial because it supports fish in the Guadalupe River.

Response - This comment is from the Department of Fish and Game. We concur with it, however, any final decisions will have to consider a balance between maintaining fish habitat created by the discharge of extracted groundwater cleanup, reuse, and conservation.

m. Does the plan say that untreated groundwater will be pumped into Canoas Creek?

Response - In order to continue the groundwater cleanup, the current practice of discharging untreated groundwater to Canoas Creek will continue until treatment units are built and operated pursuant to the cleanup plan. This current and past discharge appears not to have created problems, see comment 3.l.

n. Look into a more structured reinjection program.

Response - The remediation plan currently calls for a reinjection program on-site. Details of this program are due to be submitted in January 1990. When reviewing the detailed program this comment will be considered.

o. Is IBM going to continue to reuse water to irrigate trees that bear crops which are sold?

Response - The remediation plan does call for continued irrigation of fruit trees on IBM's property.

p. Have drought conditions been taken into account?

Response - Contingency 2 of the Remedial Action Plan specifically addresses cleanup

3. GROUNDWATER REUSE

a. Increase reuse to 100%.

Response - The SCR have been amended to increase the reuse goal from 50 to 100%.

b. Reuse should be maximized on and off site.

Response - see Response 3.a.

c. Consider growing hay on nearby land and irrigating with reclaimed extracted groundwater.

Response - The Regional Board does not have the authority to specify how groundwater is to be reused. A specific proposal from IBM regarding reuse is required by December 15, 1988 as a SCR task. The Regional Board staff will review and approve this proposal and then forward it to the State Board for their review, as required by State Board Resolution 88-88. This proposal will also be available for public review at the Regional Board office and at the Santa Teresa Library. Implementation of the plan most likely will require further Board action to adopt reclamation requirements.

d. IBM should be required to construct and test appropriate facilities wherever recharge or direct reuse is feasible.

Response - Specific proposals for groundwater treatment and reuse must be submitted to the staff and Board for approval prior to implementation. Also, see Response 3.c.

e. Market treated groundwater.

Response - See Response 3.c.

f. Chemicals should not be allowed to enter Great Oaks Water Company (GOWC) supply wells due to recharge.

Response - Staff will review any proposals for recharge to reasonably assure that water supply wells and beneficial uses will not be adversely impacted. A significant factor in this concern which is beyond the control of IBM and the Regional Board is the rate and duration of pumping by the local water users, including GOWC, which potentially could draw pollutants from the IBM site to their wells regardless of what is done at the site.

g. Plume movement should not be allowed during recharge.

Response - The cleanup plan requires that during remediation the plume of chemicals, as defined by the 0.25 HI, not expand.

h. Avoid use of recharge ponds unless a severe drought exists.

Response - See Response 3.c.

h. Cleanup should be to non-detectable levels in order to comply with the Non-degradation Policy.

Response - The Non-degradation Policy requires reasonable cleanup. Staff does not believe that cleanup to non-detectable levels can be justified as reasonable given technical and economic constraints and the need to conserve groundwater.

i. Cost should not be considered when establishing cleanup levels.

Response - Cost is only one consideration, others include beneficial uses, technical feasibility, drinking water standards, and the need to conserve groundwater. In addition, under CERCLA costs must be considered when evaluating remedial action plans.

j. Support the Hazard Index approach to setting cleanup levels.

Response - none

k. Recommend establishing a carcinogenic Hazard Index goal of 0.25.

Response - The Remedial Action Plan's Hazard Index (HI) goals are now 0.25 for non-carcinogens and 1.0 for carcinogens. The reasons for the different indices include: 1. The chemicals of primary concern, the ones which have migrated off-site, are all non-carcinogens; 2. The carcinogens are essentially confined to on-site in the shallow A aquifer, which, while it is a potential drinking water source, is not now used for drinking water; and 3. The method of calculating the two indices are not the same, with the non-carcinogen index based on laboratory data and the carcinogen index based on statistical analysis, therefore setting the same value does not have a basis. Objectives of the investigations and studies to date are not detailed enough to define the extent and nature of cleanup that would be needed to reach a CHI of 0.25. For the above reasons, at this time staff does not recommend modifying the CHI or delaying a final decision. However, staff believes this is a valid concern and has therefore added a requirement that such a modification be evaluated when doing the five year evaluation of the Remedial Action Plan.

l. Pumping should not continue since the groundwater is already safe to drink.

Response - The protection of beneficial uses, in this case drinking water supply, is just one of the goals of this cleanup plan. The other major goal is to implement the State's non-degradation policy by cleaning up the water to the extent reasonable. In addition, cleaning up to below drinking water standards adds an extra level of protection should those standards change in the future or if future spills or leaks occur.

m. Require each separate operation to meet the one in a million cancer risk requirement.

Response - The remediation plan requires all groundwater to be cleaned up to the 1.0 CHI, or one in million additional cancer risk. Putting separate requirements on each operational unit would not increase the cleanup of the groundwater.

b. Cleanup should be permanent.

Response - The remediation plan will implement a permanent cleanup of pollutants in groundwater and soil along with continued monitoring to assure the effectiveness of the cleanup. Permanent destruction of the pollutants is possible under the plan using air pollution control equipment. The Plan relies on the permitting process of the Bay Area Air Quality Management District to protect public health and the environment from exposure to airborne pollutants. A decision on whether permanent destruction of the pollutants is necessary will be made by the BAAQMD based on their permitting process. An analysis of the impact of air pollutants in the plan shows insignificant impact, i.e. a maximum of less than a one in ten million increased risk of cancer due to exposure to untreated air emissions.

c. The final cleanup should not rely on dilution.

Response - The remediation plan relies primarily on the extraction and treatment of groundwater to meet cleanup goals. The need to conserve groundwater does limit the amount of extraction feasible. Also, there will be some dilution through natural processes. However, dilution is not a major method of meeting the cleanup goals.

d. Permanent destruction of pollutants using innovative technology is needed.

Response - Innovative technology was addressed in the draft remediation plan. See Response 2.b.

e. Final cleanup levels should not be based on drinking water action levels.

Response - Cleanup levels are based on two major bases contained in Federal and State law, regulation, and policy. *First* is a *legal* requirement for the protection of the beneficial uses of the groundwater. This requires that the groundwater be cleaned up to at least potable drinking water levels. The second basis is the State's policy to maintain the existing high quality of the waters of the state (non-degradation policy), which requires cleanup to the extent reasonable. Available information indicates that cleanup to a hazard index (HI) of 0.25 for non-carcinogens and a 1.0 HI for carcinogens, which is much more stringent than most drinking water standards, meets the nondegradation goal. The remediation plan does allow for even stricter levels if information gathered during the cleanup shows that further removal of chemicals is reasonable or necessary.

f. Cleanup levels should not be arbitrarily set.

Response - Cleanup levels are based on drinking water requirements and the extent of chemical removal that is technically and economically reasonable. Also, see Response 2.e. above.

g. Concern about future changes in acceptable levels of chemicals in drinking water.

Response - The remediation plan allows the Regional Board to modify cleanup goals if drinking water standards are modified in the future. Also, the cleanup goals in the plan are below the current standards, which allows an extra margin of safety.

RESPONSIVENESS SUMMARY

SUMMARY OF COMMENTS AND STAFF RESPONSES

The following comments are summarized from the submitted written comments and oral comments and testimony made during the evening staff workshop of August 11 and the Board Public Hearing of August 17. The key to the person or agency responsible for the comment is shown previously; correspondence is at Appendix D and verbal comments are from transcripts or the staff meeting summary.

1.EDENVALE GAP

a.There should be additional control of groundwater passing through the Edenvale Gap.

Response - The remediation plan established cleanup goals throughout the plume area, including the Edenvale Gap. The groundwater at the Gap will need to be controlled by IBM to meet those goals. Staff has amended the Site Cleanup Requirements (SCR) to include additional limits at the Gap of 30 ppb for Freon and TCA and 0.6 ppb for DCE. These additional limits further define the distribution of chemical concentrations within the cleanup goals and should assure no additional degradation of groundwater beyond the Gap.

b. Continuous monitoring should be required at the Gap wells.

Response - The remediation plan includes a self monitoring plan which requires frequent monitoring of all monitoring and extraction wells in and near the Edenvale Gap area. This monitoring plan is based upon extensive past data.

c. Current restrictions on movement of chemicals should remain in the remediation plan.

Response - The current limits on chemicals passing through the Gap are 10 ppb for TCA and Freon and 0.5 ppb DCE. These limits were viewed as interim when they were adopted by the Regional Board with the understanding that they would most likely not apply when the Board established the (then tentative) final cleanup goals of 0.25 NCHI. These limits have been revised as described in Response 1.a. to be consistent with the overall remediation plan.

d. Add concentration limits for TCA and Freon at the Gap.

Response - See Response 1.a. above.

e. Add pumping monitoring well at the Gap.

Response - Staff concurs that this would help assure better monitoring of groundwater passing through the Gap and has added this requirement to the SCR.

2. CLEANUP LEVELS

a. Support prop [illegible] cleanup goals.

Response -

s. The 40 ug/l effluent limitations for TCA and Freon 113 are too low for an instanteous maximum limit. The limits should be 60 ug/l or higher for each chemical.

t. IBM requests clarification of the "flow through 96-hour bioassays", and of the relationship between these bioassays and the bioassay test program requested by the Regional Board in its 12 August 1988 letter.

u. If receiving water limitations apply to groundwater discharges routed through storm sewers, the quality of the receiving water should be judged based on the concept of no net adverse impact, taking into account upstream water quality when appropriate.

Non-Editorial Comments - Groundwater Self-Monitoring Program

v. Revision to Section C.1 - Violation of Requirements to change criteria on which an increase in sample collection and analysis is based.

w. Revise language in Section C.3.d regarding Self-Monitoring Plan Revisions. Add language that specifies when regular sampling frequency will resume.

b. Board should use Consent (rather than unilateral) format to address issues which may need to be reopened.
c. IBM does not concede that the RWQCB has the jurisdictional power to issue the proposed Order.
d IBM does not concede that its activities have created a condition or threat of pollution or nuisance, or a significant threat to the environment.
e. Revision to indicate that other possible sources exist for chemicals found in the area beyond Edenvale Gap.
f. Clarification that the RWQCB will continue to regulate the IBM cleanup, whether or not IBM continues to be considered as a CERCLA site.
g. Soil remediation goals should be 100 times the applicable DHS drinking water action level or equivalent rather than 1ppm for each chemical of concern. Also, soil remediation goal should only be applied in areas where there's a reasonable potential for exposure.
h. IBM notes that CERCLA Section 121(e) appears to provide an exemption from compliance with CEQA or other permitting rules.
i. IBM suggest deletion of the proposed Prohibitions, or at a minimum, editorial changes as mentioned in #13 above.
j. Chemical concentrations to be used in Hazard Index calculations should be running annual averages calculated quarterly.
k. Revision to remove goal of 50% reuse of extracted groundwater.
l. Add Specification 8 which acknowledges the possible impacts on the groundwater levels of users other than IBM.
m. Various changes to task submittal dates.
n. Delete Provision 13, it is covered by the provisions of Water Code Section 13271.

Non-Editorial Comments - NPDES Permit Tentative Order

o. The flow rate limitation for Waste 003 should be revised from 1.0 MGD to 2.5 MGD.
p. Revise paragraph in Finding 6 on "Description of Waste 005" to state that the polluted groundwater produced from intermittent sample collection from all aquifer zones will be considered on a case by case basis. Further revise that same paragraph to state that treatment and disposal of groundwater produced from aquifer testing of the A-aquifer zone wells will be on a case by case basis.
q. IBM should have the option of monitoring the oil and grease limitations as either oil and grease or as total organic carbon.
r. IBM should not be held accountable for effluent limitations that are beyond its control due to the natural environment.

8. Editorial Comments - SCRs Tentative Order

a. The phrase "organic chemicals" should be used in place of "organic solvents"
b. IBM objects to the use of the terms "pollution" and "pollutants".
c. Minor language changes in Finding 8 - Effects on Water Supply Wells.
d. Revision to clarify that IBM is not solely responsible for groundwater changes in the Santa Teresa Basin.
e. Incorrect number of alternative plans evaluated.
f. Clarify that recharge of significant amounts of groundwater is expected after January 31, 1989.
g. Correction to make a more accurate statement about the meaning of an NCHI of 1.0.
h. Clarification of language in Finding 19 regarding remediation levels.
i. The remediation goals in Table 2 and Specification 4 apply only to the transmissive areas of the A-aquifer zone.
j. Clarification to confirm that the cleanup plan is consistent with the provisions of the Water Code and the Health and Safety Code.
k. Clarification of language in Prohibitions to specify what actions do or do not constitute violations, and confirmation that pollutant migration which is not considered a violation under Specification 3 would not be considered "significant migration" under Prohibitions 2 and 3.
l. Incorrect table references shown in denominators in the equations for computing the Hazard Indices.
m. Specification 7 to include a list of initial compliance wells.
n. Change of language in Provision 4 on completion delays.
o Language change in Provision 6 on Quarterly Monitoring Reports.
p. Minor language change in Provision 11 regarding Board access to IBM documents.

Editorial Comments - NPDES Permit Tentative Order

q. Modify language in Finding 12 regarding effluent limits.
r Language change regarding re-evaluation of the permit.
s Incorrect table references shown in denominators in the equations for computing Hazard Indices.

9. Non-Editorial Changes - SCRs Tentative Order

a. Better definition needed regarding grounds for reopening the remediation plan for further Board review or action.

Soil Cleanup (continued)	CITY	CTY	DHS	EPA	F&G	PUBLIC	CBE/ SYTC	SCVWD	WATER RETAILERS
d. Can bio-remediation be used to enhance soil cleanup?								I	
e. The soil cleanup goal should be 100 times the applicable DHS drinking water action level or equivalent						I			
Miscellaneous - Total Number of Comments - 14									
a. Proper monitoring should be performed						II			
b. IBM should remain a proposed CERCLA site							I		
c. If Technical Assistance Grants are not available, IBM should be encouraged to put up an equivalent amount of money to substitute for the Federal program							I		
d. There are no precise recharge capacity estimates, yet							I		
e. Board should investigate ways to limit paperwork associated with developing cleanup plans						I			
f. Need more leadership and less averaging of opinion in deciding critical issues						I			
g. Board should develop more and better public education materials, particularly with regard to public safety and risk						I			
h. How long until the treatment systems are built and operating?						I			
i. To what degree was Plan 6 authored by IBM?						I			
j. Was land subsidence addressed in the plan?							I		
k. Who is responsible if subsidence does occur?							I		
l. Strike the enforcement paragraph ("D") in the Plan, it has IBM policing itself						I			
m. Board should write a new order requiring that IBM bring in surface water and inject it at their property line to keep the pollutants on their property						I			

	CITY	CTY	DHS	EPA	F&G	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS
4. Air Emissions (continued)									
f. How soon will you evaluate the effectiveness of the scrubbers?						1			
g. What problem would there be in putting the scrubbers on the air strippers before the strippers are up?						1			
h. Will vapor recovery go on 20 years or beyond if 1 ppm is not met, or will it continue only until recovery levels off?								1	
5. Cost - Total Number of Comments - 5									
a. Cost relative to Hazard Index and amount of water should be published						1			
b. Multiple bureaucracies cause delay and increase costs						1			
c. IBM should spend whatever it takes to restore the water						1			
d. Board should focus on what is best for public health and the environment, not on what a company can afford						1			
e. Is IBM paying for all of the water they're pumping out of the ground?						1			
6. Soil Cleanup - Total Number of Comments - 5									
a. Steam injection will work with vapor recovery, the oil industry uses it frequently						1			
b. How is the soil going to be cleaned up?						1			
c. Have you evaluated other soil cleanup methods such as steam injection in conjunction with soil venting?							1		

Groundwater Reuse (continued)	CITY	CTY	DHS	EPA	F&O	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS
Does the plan say we're going to pump untreatable water into Canoas Creek?						I			
Look into more structured reinjection: pump water back to just south of the IBM site, reinject into aquifer, then recycle by pumping out again							I		
Is IBM going to continue to reuse water to irrigate trees that bear crops that are going to be sold?						I			
Have you taken into account the possibility of drought conditions continuing?						I			
Do you have any intent of forcing the SCVWD to blend the reused water into our existing water system?								I	
What objection does the SCVWD have to discharging the treated water into their percolation ponds?						I			
How much of the system to pipe the reused water to market is IBM going to pay?						I			
Air Emissions - Total Number of Comments - 8									
Should require air scrubbers						I	I		
Don't allow Freon emission into air (to protect ozone layer)						I			
What happens to the material that's volatilized when you purify the water? Is it released to the atmosphere?						I			
Do you add together all the nearby sources of air pollution when determining what standards are appropriate to meet?						I			

2. Cleanup Levels (continued)	CITY	CTY	DHS	EPA	F&O	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS
j. Support Hazard Index approach to setting cleanup levels						I			
k. Carcinogenic Hazard Index of 0.25 recommended			I						I
l. Pumping should not continue since water is already safe						I			
m. Require each separate IBM operation (the electronics shop, machine shop, etc.) to meet the one cancer death per million requirement						I			
3. Groundwater Reuse - Total Number of Comments - 27									
a. Increase reuse to 100%						I		I	I
b. Reuse should be maximized on and off site			I			II		I	I
c. Consider growing hay on the unused land nearby, irrigate it with reclaimed water						I			
d. IBM should be required to construct and test appropriate facilities wherever recharge or direct use is feasible									I
e. Market treated groundwater								I	
f. Chemicals should not be allowed to enter Great Oaks water supply wells due to recharge							I		
g. Plume movement should not be allowed during recharge						II			
h. Avoid use of recharge ponds unless a severe drought exists						I			
i. Treated groundwater should not be blended into existing water supplies						I			
j. Don't put any unclean water into the underground basin									II
k. Stop discharging water to Canoas Creek						I			
l. Discharge of treated groundwater to Canoas Creek is beneficial because it supports Guadalupe River fishery					I				

MATRIX OF COMMENTS IN RESPONSE TO THE IBM TENTATIVE ORDER

	COMMENT ORIGINATION								
COMMENTS	CITY	CTY	DHS	EPA	F&O	PUBLIC	CBE/ SYTC	SCVWD	WATER RETAILERS
1. Edenvale Gap - Total Number of Comments - 9									
a. Need controls at Edenvale Gap			I					I	I
b. Want continuous monitoring at Gap						I		I	I
c. Current restrictions on movement of contaminants should remain in cleanup permit							I		
d. Add numerical concentration levels for TCA and Freon at the Gap, consistent with the overall 0.25 level								I	I
e. Add pumping monitoring well at the Gap									
2. Cleanup Levels - Total Number of Comments - 22									
a. Support proposed cleanup goals			I			III		I	I
b. Need permanent cleanup							I	I	
c. Cleanup should not be by dilution							I		
d. Need permanent destruction of pollutants using innovative technologies							I		
e. Should not use drinking water action levels as basis for cleanup levels						II			
f. Cleanup levels should not be arbitrary						I			
g. Concerned about future changes in what are now considered to be "acceptable" levels						II			
h. Cleanup should be to non-detectable based on the "non-degradation" policy								I	
i. Cost should not be considered in determining cleanup levels						I			

3. Groundwater Reuse - The primary concerns were for the maximization of reuse and for what the treated water should or should not be used. With 27 comments made by 6 groups, this issue ranked first in significance to the commentors.

CITY	CTY	DHS	EPA	F&G	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS	TOTAL
		1		1	14	2	4	5	27

4. Air Emissions - The major area of interest was in assuring that air scrubbers would be part of the air treatment system. Eight comments were received on this general topic, from 3 different groups, making the issue rank fourth in local interest.

CITY	CTY	DHS	EPA	F&G	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS	TOTAL
					6	1	1		8

5. Cost - Interest was expressed in focusing less on the cost of cleanup and more on the "quality" of the cleanup. Five comments came in from the public on this issue, ranking it fifth along with Soil Cleanup.

CITY	CTY	DHS	EPA	F&G	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS	TOTAL
					5				5

6. Soil Cleanup - The exploration of steam injection as a soil cleanup method was the issue most frequently raised. Three different groups made a total of 5 comments on this general topic, causing it to rank fifth along with Cost.

CITY	CTY	DHS	EPA	F&G	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS	TOTAL
					3	1	1		5

7. Miscellaneous - Fourteen comments on other diverse topics were made by two groups. This category seemed appropriate for those comments.

CITY	CTY	DHS	EPA	F&G	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS	TOTAL
					9	5			14

IBM RESPONSIVENESS SUMMARY

The purpose of this Responsiveness Summary is two-fold: first, it provides the Regional Water Quality Control Board with information about the community's general concerns about the site and their preference regarding the proposed cleanup plan, and second, it demonstrates to members of the public how their concerns were taken into account as part of the decision making process.

Six major issues were raised regarding the IBM Tentative Orders and Proposed Final Cleanup Plan. These were: the need for additional controls or monitoring at Edenvale Gap, concerns about the adequacy and appropriateness of the Cleanup Levels, how much Groundwater Reuse is enough, Air Emissions, the Cost of Cleanup, and Soil Cleanup. Concerns which did not fall into these categories are addressed in the section titled Miscellaneous. A separate section addresses IBM's comments.

A description of each issue and general information about who raised that issue follows. A table which summarizes the general comments begins on page 3. IBM's comments can be found on page 8. Staff's response to all comments follows that.

DESCRIPTION OF MAJOR ISSUES

1. Edenvale Gap - The primary concerns were for continued monitoring and/or controls at the Gap. This issue ranked third in terms of number of comments, with a total of 9 comments being made by 5 different groups.

* CITY	CTY	DHS	EPA	F&G	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS	TOTAL
		1			1	1	3	3	9

2. Cleanup Levels - General interest was expressed in what the actual cleanup levels are, and in how they were established. Beyond this, concerns varied widely. Some felt that pumping should cease since the water was already safe, others felt cleanup should continue until chemicals were non-detectable. This issue ranked second in terms of number of comments made, with 22 comments coming in from 5 groups.

CITY	CTY	DHS	EPA	F&G	PUBLIC	CBE/ SVTC	SCVWD	WATER RETAILERS	TOTAL
		2			12	3	3	2	22

* = City - City of San Jose, Cty - Santa Clara County, DHS - Department of Health Services, EPA - Environmental Protection Agency, F&G - Fish & Game, Public - People unaffiliated with any of the other groups, or members of public interest groups such as the League of Women Voters. CBE/SVTC - Citizens for a Better Environment/Silicon Valley Toxics Coalition, SCVWD - Santa Clara Valley Water District.

State of California

CALIFORNIA REGIONAL WATER
AUG 30 1988
QUALITY CONTROL BOARD

Department of Health Services

Memorandum

To : Steve Ritchie
Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6040
Oakland, CA 94607

Date : August 29, 1988

Subject: Tentative Order for Site Cleanup and NPDES Permit for IBM, San Jose
Santa Clara County
W43-000 GWC-IBM

From : Clifford L. Bowen, P.E. Clifford L. Bowen
District Engineer
Monterey District
Public Water Supply Branch

The subject document has been reviewed as requested. We have the following recommendations:

1. SITE CLEANUP LEVELS

The proposed remediation levels for the B- and deeper aquifers are 0.25 NCHI for noncarcinogens and 1.0 CHI for carcinogens (Reference source: Site Cleanup Requirements, page 5, Item #20). The Department of Health Services, Public Water Supply Branch, concurs with the prescribed .25 NCHI levels for noncarcinogens. However, we recommend applying the same level of hazard index at 0.25 for the carcinogens found in the IBM contamination site as final cleanup levels for the groundwater.

2. PLUME CONTROL AT AND BEYOND EDENVALE GAP

We concur with the objectives of Regional Board's IBM Cleanup Plan to (1) protect public health and the environment, (2) be technically feasible, and (3) cost-effective (Reference source: Site Cleanup Requirements, page 4, Item #15). The goal of our Drinking Water Program is to assure that water users are, to the extent possible, provided a reliable supply of safe drinking water at all times. We, therefore, strongly recommend that the aquifers used for domestic supply purposes be protected against contamination to the maximum extent possible within reasonably technical and economical limits. Consequently, we stress the need to maintain optimal plume control at the Edenvale Gap, a critical zone of chemical capture of the IBM Cleanup Program in order to minimize the release of chemicals beyond the Gap and into the undefined "Region II" area. Since Region II aquifers are extensively used by downstream municipal and private communities for domestic supply, the release of chemicals beyond the Gap would directly impact the water quality of the domestic water sources of these downstream users. Those remediation levels permitted under the subject order should not be used to condone contamination up to those levels where the release of those contaminants can be minimized by available technology and economically feasible measures.

3. EXTRACTED GROUNDWATER REUSE

The Department of Health Services recognizes that the extracted groundwater generated in the IBM Cleanup Program is a significant resource which should not be wasted. We support the State Water Resources Control Board's Resolution No. 88-88 to maximize beneficial reuse of the extracted groundwater. We further concur with the Regional Board's proposed treatment levels at 1 ppb or less of total volatile organic chemicals for extracted water to be recharged into the groundwater aquifers (Reference source: IBM Superfund Site Fact Sheet #3, July 1988, page 6). These proposed levels for the extracted water would be adequate from a public health standpoint to not compromise the beneficial use of the recharged groundwater aquifers for subsequent domestic/drinking purposes.

4. Please forward copies of all correspondence, reports and documents pertaining to compliance with the Site Cleanup Requirements to the Department of Health Services - Public Water Supply Branch (Reference source: Site Cleanup Requirements, C. Provisions, Item #10, pages 14-15).

We appreciate the opportunity to provide technical review and evaluation relating to water supply issues of the IBM Cleanup Program. For further questions on this matter, please contact Catherine S. Ling at (415) 540-2160.

cc: IBM Mailing List
Retail Water Agencies